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February 23, 1998

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Michael Bellot, Project Manager United States Environmental Protection Agency, Region 5 77 West Jackson Boulevard Chicago, Illinois 60604-3590

Re: Monitoring Well Assessment Report Blackwell Forest Preserve Landfill DuPage County, Illinois

Dear Mr. Bellot:

On behalf of the Forest Preserve District of DuPage County (FPD), we are pleased to submit the Monitoring Well Assessment Report for the Blackwell Landfill. This report provides integrity survey data and installation logs for the 29 monitoring wells and piezometers that are included in the Quarterly Groundwater Monitoring Program.

If you have any questions or comments about this report, please contact me at 630/691-5000.

Sincerely,

MONTGOMERY WATSON

Walter G. Buettner, P.E.

**Project Manager** 

Enclosure

cc: Rick Lanham – Illinois Environmental Protection Agency Kurt Lindland – Assistant Regional Counsel, U.S. EPA Jerry Hartwig – Forest Preserve District of DuPage County Kostas Dovantzis – Tetra Tech EM, Inc.

Tel: 630 691 5000

Fax: 630 691 5133

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#### MONITORING WELL ASSESSMENT REPORT

# BLACKWELL FOREST PRESERVE LANDFILL SITE DUPAGE COUNTY, ILLINOIS

Montgomery Watson File No. 1252008

# **Prepared For:**

Forest Preserve District DuPage County, Illinois

Prepared By:

Montgomery Watson 2100 Corporate Drive Addison, Illinois 60101

February 1998



## MONITORING WELL ASSESSMENT REPORT

# BLACKWELL FOREST PRESERVE LANDFILL SITE DUPAGE COUNTY, ILLINOIS

# **Prepared For:**

Forest Preserve District DuPage County, Illinois

Prepared by:	Walter 199	2/23/48
· for	Judith M. Kinch Project Geologist	Date
Approved by:	Walter G. Buettner, P.E. Project Manager	

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#### 1.0 INTRODUCTION

Montgomery Watson was retained by the Forest Preserve District of DuPage County (FPD) to perform certain pre-design investigations at the Blackwell Landfill NPL Site (Site), located in DuPage County, Illinois (Figures 1 and 2). These investigations were required as part of the Administrative Order of Consent (AOC), U.S. EPA Docket No. V-W-96-C-341, between the U.S. EPA and the FPD. One of the objectives of the pre-design field investigations was to provide additional background water quality data for the long-term groundwater monitoring program. This report provides a summary of a two-year quarterly groundwater monitoring program developed for the Site, as well as the integrity surveys, well redevelopment, and new well installations conducted prior to the start of the two-year monitoring program.

#### 2.0 SCOPE OF WORK

Specific recommendations for a two-year quarterly groundwater monitoring program were developed by Montgomery Watson (July 1997 Revised Predesign Report) and approved by U.S. EPA in an August 21, 1997 letter. The approved program included requirements for:

- Performing a monitoring well/piezometer integrity survey;
- Installing five new monitoring wells (one detection and four compliance wells);
- Groundwater quality monitoring in 13 detection monitoring wells located between the landfill and the FPD property boundary;
- Groundwater quality monitoring in 10 compliance monitoring wells located along the downgradient FPD property boundary; and
- Measuring groundwater levels in the 13 detection, 10 compliance, and six existing monitoring wells/piezometers.

#### 2.1 SCOPE

Work to address the first two requirements listed above was conducted in phases. Phase I was completed in October 1996 and involved monitoring well/piezometer integrity surveys and redevelopment of wells/piezometers which were preliminarily selected for the proposed quarterly groundwater monitoring program. The objectives of the monitoring well/piezometer integrity survey were to identify redundant and unnecessary monitoring locations that could be eliminated from the quarterly groundwater monitoring program, and to document the integrity of existing wells/piezometers proposed for inclusion in the program. The results of these activities were provided in the July 1997 Revised Predesign Report which also included a reevaluation of the list of wells/piezometers preliminarily selected for inclusion in the groundwater monitoring program. The reevaluation resulted in the selection of some alternative wells/piezometers for the quarterly groundwater monitoring program.

Phase II, which is the subject of this report, was completed in September 1997 and involved additional monitoring well/piezometer integrity surveys and redevelopment of the alternative wells/piezometers selected in Phase I. In addition, five new monitoring wells were installed, developed, and surveyed. These new and existing wells form the compliance and detection monitoring network for the lower and upper aquifers beneath the Site. The wells/piezometers in the final quarterly groundwater monitoring program, including the new wells, are shown on Figures 3 and 4 and listed below.

## **DETECTION MONITORING WELLS**

Glacial Outwash Aquifer Wells	Bedrock Wells
G107S	G128D
<b>G</b> 117	G135
G118S	G140D
G123	G141D
G126	G145 (new well)
G127	·
G129	
G130	

# COMPLIANCE MONITORING WELLS

Glacial Outwash Aquifer Wells	Bedrock Wells
G122	G131D
G133S	G133D
G142 (new well)	G138
G143 (new well)	G139
G144 (new well)	G146 (new well)

# WATER LEVEL WELLS

Bedrock Wells
G132D
G134
G137 <sub>.</sub>

#### 3.0 PHASE II FIELD ACTIVITIES

The following sections document the Phase II monitoring well/piezometer integrity survey, the redevelopment of alternative existing wells, and the installation/development/surveying of the new wells:

#### 3.1 MONITORING WELL/PIEZOMETER INTEGRITY SURVEY

The Phase II monitoring well/piezometer integrity survey was performed on September 23, 24, and 29, 1997, in accordance with the Field Sampling Plan for Pre-Design Investigation Activities (August 1996). The objective was to conduct inspections of seven existing wells/piezometers not previously evaluated during Phase I. The existing wells/piezometers that were inspected are:

- G132D (Bedrock Well)
- G134 (Bedrock Well)
- G137 (Bedrock Well)
- G130 (Glacial Outwash Aquifer Well)
- G131D (Bedrock Well)
- G135 (Bedrock Well)
- P2 (Glacial Outwash Aquifer Well)

Boring logs and well/piezometer construction details for these existing wells are provided in Appendices A and B, respectively.

The survey included inspections to evaluate whether the wells/piezometers were structurally sound, adequately protected, and capable of providing representative groundwater data. Specifically, the following tasks were performed during the survey:

- The condition of the lock, protective casing, and surface seal was noted.
- The presence/absence of material between the outer and inner casings was noted.
- The presence/absence of an outer casing weep hole was noted. A weep hole was drilled if not already present.
- The total well/piezometer depth was measured.
- A bailer was lowered to the bottom of the well/piezometer to check for obstructions.
- Each well/piezometer was photographed.

This information was recorded on monitoring well/piezometer well integrity evaluation forms, which are provided as Appendix C. The Phase II well/piezometer integrity survey results are summarized in Table 1. For completeness, the Phase I integrity survey results are also summarized in the table.

Problems or deficiencies, if any, were noted on each integrity survey form. The following table summarizes problems which were noted and subsequent corrective actions which were implemented:

Problem	Corrective Action		
All wells/piezometers lacked a protective casing weep hole.	A weep hole was drilled in each protective casing.		
G132D well cap did not fit.	G132D was equipped with a new well cap.		
G130 and G131D have slightly heaved surface seals.	No action taken because the wells are in good condition otherwise.		
G134D existing dedicated bailer is lodged inside well.	No action taken because this well is only used for water level measurements.		
G134 surface seal has slightly subsided.	No action taken because the well is in good condition otherwise.		

During the survey, it was also noted that wells G121 and G123 lacked well caps, and well G107S was not properly secured. To correct these deficiencies, G121 and G123 were equipped with new well caps and G107 was secured with a new chain and lock.

#### 3.2 EXISTING MONITORING WELL REDEVELOPMENT

The following seven wells were redeveloped during Phase II:

- G107S (Glacial Outwash Aquifer Well)
- G118S (Glacial Outwash Aquifer Well)
- G121 (Glacial Outwash Aquifer Well)
- G127 (Glacial Outwash Aquifer Well)
- G130 (Glacial Outwash Aquifer Well)
- G131D (Bedrock Well)
- G135 (Bedrock Well)

These monitoring wells were redeveloped using a submersible pump. During redevelopment, the wells were periodically surged by alternately lifting and lowering the pump. Field parameters including pH, dissolved oxygen, specific conductance, turbidity, and temperature, were monitored during redevelopment using a flow-through cell. The more productive, outwash aquifer wells were purged until a minimum of seven well volumes was removed and, if practical, field parameters had stabilized. The less

productive, bedrock aquifer wells were purged until dry, allowed to recover, and then purged dry again.

In general, the monitoring wells were redeveloped until three consecutive field parameter measurements, to the extent practical, were within 10% of each other; turbidity values did not typically stabilize since purging was conducted at a high rate. A summary of well redevelopment results, including data from Phase I, is provided in Table 2. Well development forms, including those for Phase I, are presented as Appendix D.

#### 3.3 NEW MONITORING WELL INSTALLATION AND DEVELOPMENT

Five new monitoring wells (G142, G143, G144, G145, and G146) were installed on the west side of the landfill in accordance with the July 1997 Revised Predesign Report. The locations of these new wells are shown on Figures 3 and 4.

Three of the wells, G142, G143, and G144, were screened in the upper outwash aquifer at depths ranging from 17 to 21 feet below ground surface (bgs). Each well was constructed from stainless steel riser and 10 feet of stainless steel screen, and was installed adjacent to an existing deep well, or a new deep well, to form a well pair. These new shallow wells supplement the downgradient compliance well network for the site, and will be sampled as part of the quarterly groundwater monitoring program.

The other two wells, G145 and G146, were screened in the lower bedrock aquifer at depths of 67 and 69 feet, respectively. Both wells were installed using double casing methods to minimize potential cross-contamination between the upper and lower aquifers, and each was constructed from stainless steel riser and 10 feet of stainless steel screen. G145 and G146 supplement the downgradient bedrock detection and compliance well network, respectively. Both wells will be sampled as part of the quarterly groundwater monitoring program.

Soil boring logs for the five new monitoring wells are provided as part of Appendix A. Monitoring well construction details are provided as part of Appendix B.

Each of the five new wells was developed after a minimum of 24 hours following installation. The wells were developed by hand bailing for approximately 30 minutes followed by purging using a submersible pump (Grundfos<sup>™</sup>). Surging was accomplished during development by periodically lifting and lowering the pump. Field parameters, including pH, dissolved oxygen, turbidity, temperature, and specific conductance were monitored during development. Each well was purged until a minimum of 10 well volumes, including the sand pack, was removed and, to the extent practical, until three consecutive field parameter measurements were within 10% of each other. Turbidity values did not stabilize due to the high purging rate.

Well development results are summarized in Table 2. Well development forms, which include field parameter measurements, are provided as Appendix D.

#### 3.4 SURVEY

The locations and elevations of the new monitoring wells were surveyed by an Illinois licensed surveyor following development. In addition, the existing monitoring wells and piezometers that are part of the quarterly groundwater monitoring program were resurveyed to confirm their locations and elevations. Survey data are summarized in Table 3.

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#### Table 1 Monitoring Well/Piezometer Integrity Survey Results October 1996 and September 1997 Blackwell Landfill NPL Site DuPage County, Illinois

		227.44		1 6							<del></del>	-	6.6	337.10	I Winter .	
Well	Date	Well	Screen	Screen	TOIC	Water	Water	Total Well		Locked		Materi	Surface Seal	Well Casing	Kinking	Additional
Number	Assessed	Diameter (inches)	Length (ft)	Type	Elevation (ft-msl)	Level (ft-TOIC)	Elevation	Depth (ft-TOIC)	Aquifer	and	Protective Casing	Betwee Casings	Defects		Obstructions	
G-107S	Oct. 1996	(IIICINES)	(11)	<del> </del>			(ft-msl)		Туре	Secure				No.	<del></del>	Dedicated Barler
				] [	708.60	15.12	693.48	40.4	Glacial Outw.	Yes	O.K.	None	None		None	Dedicated Bailer
G-114	Oct. 1996	4		:	709.40	16.50	692.90	30.0	Glacial Outw.	Yes	O.K.	None	None	No	None	Dedicated Batter
G-117	Oct. 1996	4	ľ		707.44	14.92	692.52	30.0	Glacial Outw.	Yes	O.K.	None	None Minor <sup>(1)</sup>	No	1	Dedicated Bailer
G-118S	Oct. 1996	4		•	711.33	17.90	693.43	22.9	Glacial Outw.	Yes	O.K.	None		No	None	
G-121	Oct. 1996	4	5	••	703.71	11.62	692.09	20.6	Glacial Outw.	No <sup>(2)</sup>	O.K.	None	None	No	None	Dedicated Bailer
G-122	Oct. 1996	4	5	) ··	706.52	14.44	692.08	25.6	Glacial Outw.	Yes	O.K.	None	None	No	None	Dedicated Bailer
G-123	Oct. 1996	4	5	••	707.77	15.30	692.47	22.0	Glacial Outw.	Yes	О.К.	None	None	No	None	Dedicated F ider - Hornet nest in well <sup>15</sup>
G-126	Oct. 1996	4 .	10	PVC	704.50	12.36	692.14	19.3	Glacial Outw.	Yes	О.К.	None	None	No	None	Dedicated Bailer
G-127	Ост. 1996	4	10	PVC	706.66	14.60	692.06	20.9	Glacial Outw.	Yes	O.K.	None	None	No	None	Dedicated Bailer
G-128D	Oct. 1996	4	10	PVC	707.41	15.49	691.92	56.4	Dol. Bedrock	Yes	O.K.	None	Minor <sup>(1)</sup>	No	None	Dedicated Bailer
G-129	Oct. 1996	4	10	PVC	702.86	9.90	692.96	19.2	Glacial Outw.	Yes	О.К.	None	None	No	None	Dedicated Bailer
G-130	Sept. 1997	4	10	PVC	710.40	16.91	693.49	24.1	Glacial Outw.	Yes	O.K.	None	Minor (1)	No	None	Dedicated Bailer
G-131D	Sept. 1997	4	10(4)	None	706.03	14.45	691.58	54.1	Dol. Bedrock	Yes	O.K.	None	Minor (1)	No	None	Dedicated Bailer
G-131D <b>D</b>	Sept. 1997	4	10(4)	None	705.83	14.70	691.13	64.6	Dol. Bedrock	Yes	О.К.	None	None	No	None	Dedicated Bailer
G-132D	Sept. 1997	4	10(4)	None	725.99	28.10	697.89	84.5	Dol. Bedrock	Yes	О.К.	None	None	No	None	Dedicated Bailer; Well cap does not fit
G-1335	Oct. 1996	4	10	PVC	708.04	15.74	692.30	23.0	Glacial Outw.	Yes	О.К.	None	None	No	None	Dedicated Bailer
G-133D	Oct. 1996	4	10(4)	None	707.84	16.20	691.64	54.0	Dol. Bedrock	Yes	О.К.	None	None	No	None	Dedicated Bailer
G-134	Sept. 1997	4	30(4)	None	727.20	28.00	699.20	>100	Dol. Bedrock	Yes	О.К.	None	None	No	Yes <sup>(5)</sup>	Dedicated Bailer
G-135	Sept. 1997	4	1044	None	721.07	28.40	692.67	83.1	Dol. Bedrock	Yes	О.К.	None	Minor <sup>(6)</sup>	No	None	Dedicated Bailer
G-137	Sept. 1997	4	10	PVC	701.89	10.50	691.39	56.4	Dol. Bedrock	Yes	О.К.	None	None	No	None	Dedicated Bailer
G-138	Oct. 1996	4	10	PVC	708.69	16.83	691.86	56.2	Dol. Bedrock	Yes	О.К.	None	None	No	None	Dedicated Bailer
G-139	Oct. 1996	4	10	PVC	702.06	10.15	691.91	57.5	Dol. Bedrock	Yes	О.К.	None	None	No	None	Dedicated Bailer
G-140D	Oct. 1996	2	10.60	SS	705.55	13.66	691.89	60.7	Dol. Bedrock	Yes	О.К.	Sand	None	No	None	ļ
G-141D	Oct. 1996	2	10.7	SS	708.15	16.41	691.74	63.8	Dol. Bedrock	Yes	0.K.	Sand	None	No	None	
P-2	Sept. 1997	2	5	PVC	694.59	7.78	686.81	14.9	Glacial Outw.	Yes	0.K.	None	None	No	None	

- Notes:

  No information available
- \*\* Boring log indicates plastic screen
- (1) Slight heave of surface seat
- (2) Protective casing hinge broken
- (3) Insect spray used to remove hornet nests.
- (4) No screen: open borehole in bedrock
- (5) Dedicated bailer lodged inside well
- (6) Surface seal 4 6 inches below ground surface
- SS = Stainless steel well screen
- PVC = Polyvinyl chloride well screen
- TOIC = Top of inner easing
- msl = Mean Sea Level

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Table 2
Monitoring Well Development Summary
October 1996 and Fall 1997
Blackwell Landfill NPL Site
DuPage County, Illinois

				We	Il Developi	nent Field Pa	rameters		
Well	Date	Date	Well	Volume		Specific	Temp.	D.O.	Turbidity
Number	New Well	Existing Well	Volume	Purged	pН	Conduct.	Degree C	(mg/l)	(NTU)
	Developed	Redeveloped	(Gal)	(Gal)		(umhos/cm)			
G-107S	NA	Sept. 1997	22.9	105	7.24	592	10.37	0.65	1.4
G-117	NA	Oct. 1996	24.4	240	7.54	574	12.50	2.13	0.02
G-118S	NA	Sept. 1997	5.9	41	6.65	439	11.64	1.17	19.6
G-121	NA	Oct. 1996	16.4	110	12.6	545	14.00	1.60	8.90
G-121	NA	Sept. 1997	11.4	80	7.27	276	13.06	2.20	1.4
G-122	NA	Oct. 1996	20.4	120	6.90	835	13.30	1.20	Clear
G-123	NA	Oct. 1996	12.3	85	9.51	601	14.00	2.12	2.20
G-126	NA	Oct. 1996	12.7	70	6.79	1120	14.00	1.48	Clear
G-127	NA	Oct. 1996	11.5	70	**	**	13.10	1.60	2.80
G-127	NA	Sept. 1997	8.3	59	6.91	332	11.97	0.29	3.2
G-128D	NA	Oct. 1996	40.6	240	8.76	730	12.40	2.04	10.10
G-129	NA	Oct. 1996	17.9	120	7.35	800	12.30	2.86	56*
G-130	NA	Sept. 1997	4.0	62	6.86	517	10.06	1.12	2.1
G-131D	NA	Nov. 1997	25	35	12.28	1493	12.33	0.78	48.1
G-131DD	NA	Sept. 1997	38.8	39	13.35	1323	13.41	6.79	41.6
G-133S	NA	Oct. 1996	13.3	75	7.10	1080	12.90	1.50	Clear
G-133D	NA	Oct. 1996	38.5	210	7.00	875	12.00	0.70	Clear
G-135	NA	Sept. 1997	42.5	65	8.04	618	11.89	0.11	4.3
G-138	NA	Oct. 1996	39.5	175	7.05	1025	11.20	2.60	2.46
G-139	NA	Oct. 1996	44.6	200	7.55	717	10.80	4.40	3.98
G-140D	NA	Oct. 1996	11	60	6.95	950	11.10	1.20	Clear
G-141D	NA	Oct. 1996	16	85	8.44	684	12.20	1.14	0.19
G-142	Nov. 1997	NA	5.9	65	7.18	1068	11.77	4.10	50.7
G-143	Oct. 1997	NA	6.8	180	6.92	931	12.63	0.00	23.8
G-144	Nov. 1997	NA	9.9	120	7.10	1068	12.36	0.16	241
G-145	Nov. 1997	NA	9.6	100	7.16	625	10.16	0.15	6.1
G-146	Oct. 1997	NA	22.8	160	7.09	395	10.52	0.00	9.1

#### Notes:

N.A. = Not Applicable

D.O. = Dissolved Oxygen

\* = Turbidity units (NTU) 10 times scale factor

\*\* = Equipment malfunction

Table 3
Monitoring Well/Piezometer Survey Data - November 1997
Blackwell Landfill NPL Site
DuPage County, Illinois

# **Deep Monitoring Wells**

Deep Manifesting		1. 0		
Well		Reference Poir	nts	
Designation	North	East	TOIC	Notes
G128D	-188.1	-1716.4	707.41	Detection Well
G131D	-685.4	-1725.3	706.03	Compliance Well
G133D	-622.9	-2085.4	708.10	Compliance Well
G135	878.7	-1552.4	721.07	Detection Well
G138	-254.5	-2249.2	708.69	Compliance Well
G139	555.6	-2477.8	702.22	Compliance Well
G140D	-284.6	-1293.2	705.71	Detection Well
G141D	-291.0	-1638.4	708.33	Detection Well
G145	240.7	-1757.8	711.18	Detection Well
G146	30.1	-2495.8	706.67	Compliance Well

# **Shallow Monitoring Wells**

Well	R	eference Poin	its			
Designation	North	East	TOIC	Notes		
G107S	-212.7	-805.1	708.60	Detection Well		
G117	-296.3	-1629.7	707.44	Detection Well		
G118S	564.9	-1730.8	711.33	Detection Well		
G122	-689.7	-1563.2	706.52	Compliance Well		
G123	-137.7	-1891.7	707.77	Detection Well		
G126	-256.4	-1117.0	704.50	Detection Well		
G127	-304.8	-1405.1	706.66	Detection Well		
G129	169.5	-2035.2	702.86	Detection Well		
G130S	791.4	-1732.4	710.40	Detection Well		
G133S	-627.0	-2077.4	708.04	Compliance Well		
G142	-243.2	-2244.8	709.17	Compliance Well		
G143	30.7	-2502.1	706.56	Compliance Well		
G144	548.1	-2485.2	701.88	Compliance Well		

# Water Level Wells

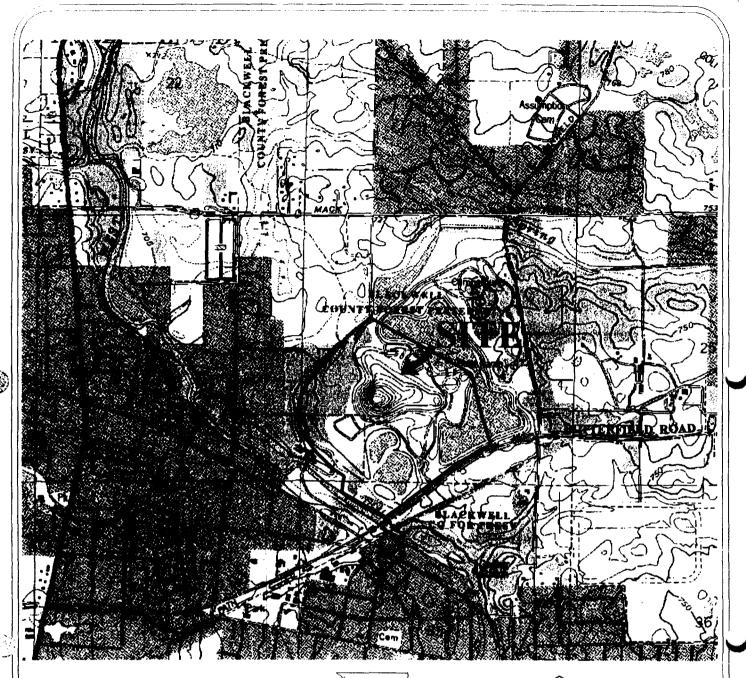
Well	R	eference Poin	its	
Designation	North	East TOIC		Notes
P2	-1401.0	-1401.3	694.59	Glacial Outwash Aquifer Well
G114	1.0	-1683.8	709.40	Glacial Outwash Aquifer Well
G121	-568.1	-722.6	703.71	Glacial Outwash Aquifer Well
G132D	1188.1	-544.2	725.99	Bedrock Well
G134	661.5	309.6	727.20	Bedrock Well
G137	-1723.7	-1010.2	701.89	Bedrock Well

**Notes** 

All depth measurements and elevations are in units of feet.

TOIC = Top of inner casing

F-GURES



ILLINOIS

north

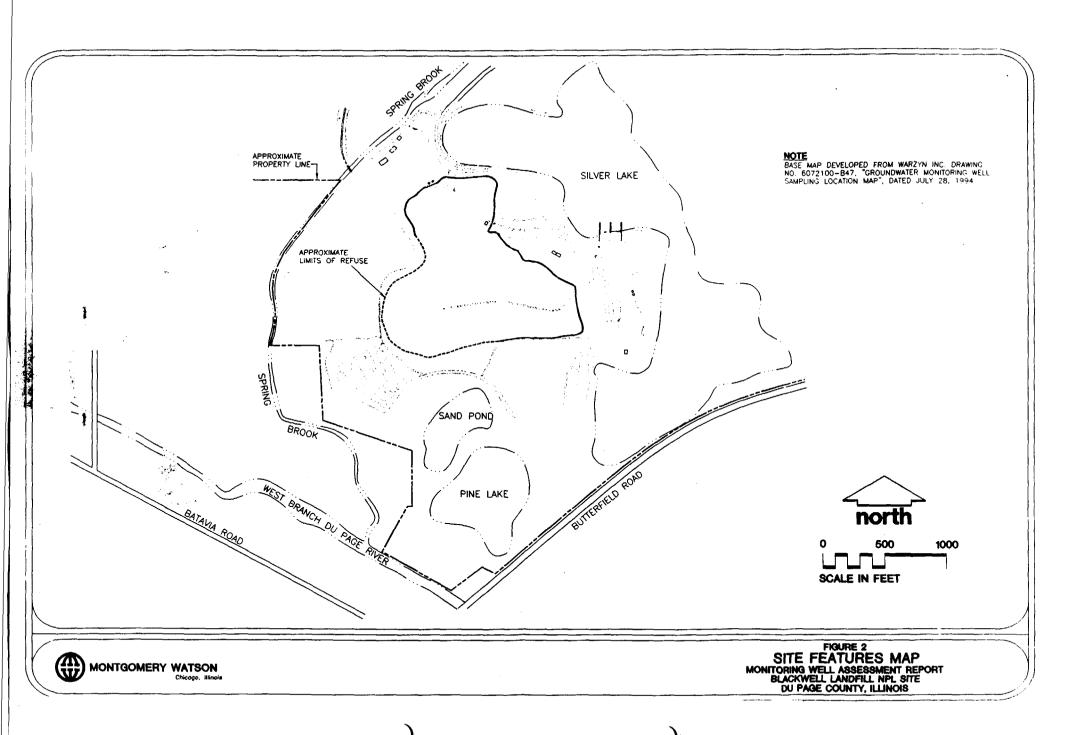
0 2000 4000 SCALE IN FEET

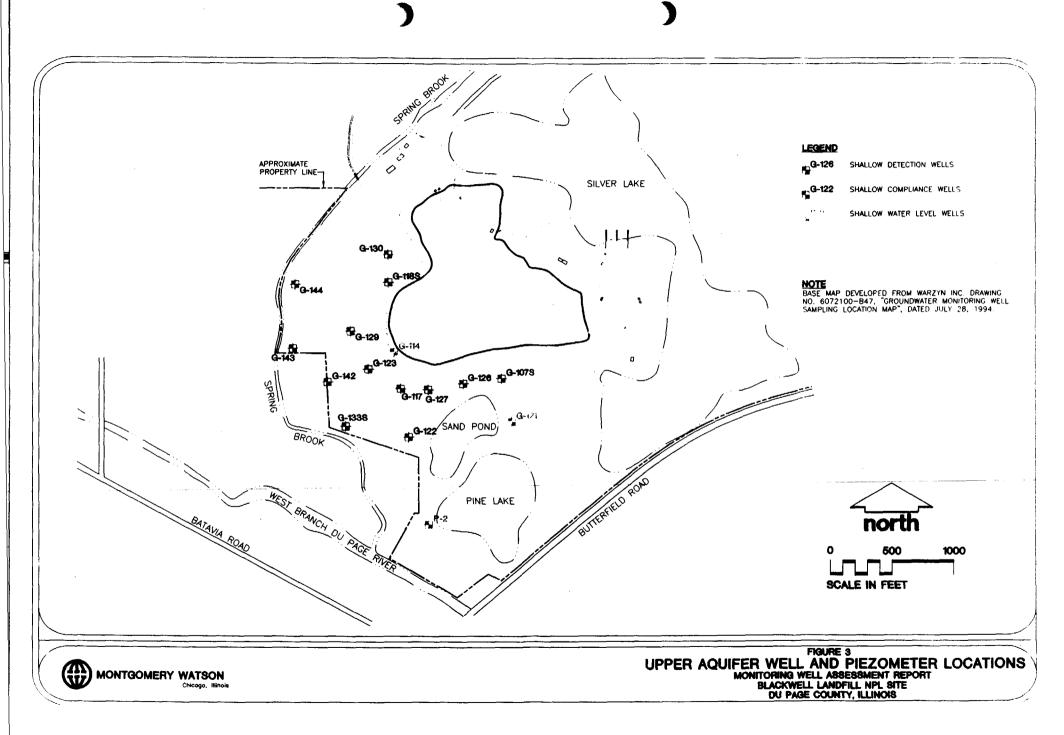
Base map developed from the Naperville, Illinois 7.5 Minute U.S.G.S. Topographic Quadrangle Map Dated 1993

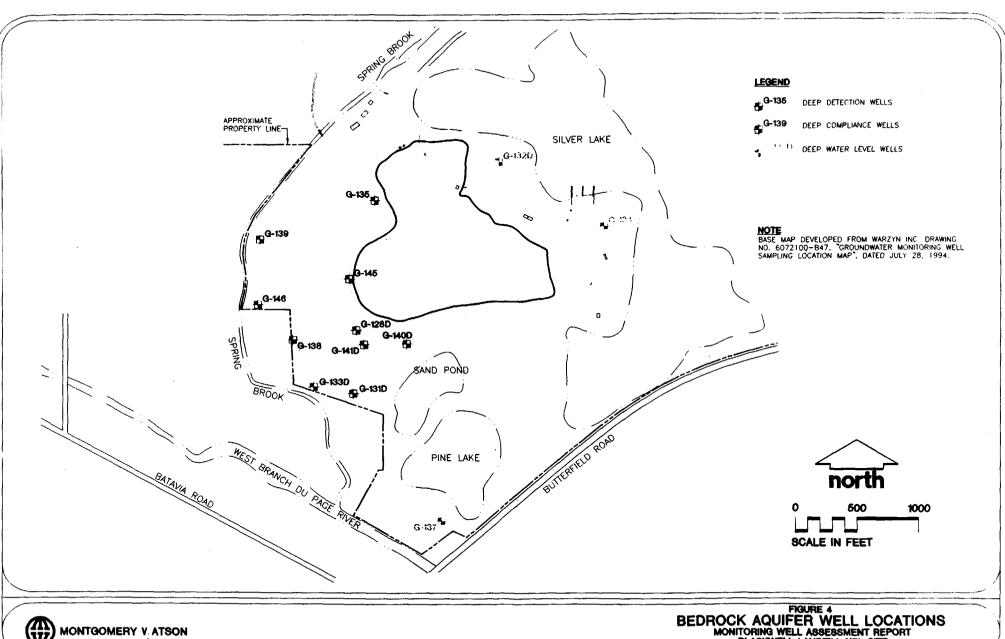


BLACKWELL LANDITLL NPL SITE DUPAGE COUNTY, ILLINOIS MONITORING ASSESSMENT REPORT

SITE LOCATION MAP FIGURE 1







Chicago, Illinois

FIGURE 4
BEDROCK AQUIFER WELL LOCATIONS
MONITORING WELL ASSESSMENT REPORT
BLACKWELL LANDFILL NPL SITE
DU PAGE COUNTY, ILLINOIS

**3** 

B

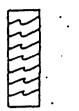
Α

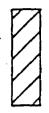
APPENDIX A

**BORING LOGS** 

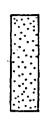
#### TESTING SERVICE CORPORATION

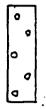
#### LEGEND FOR BORING LOGS

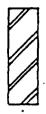


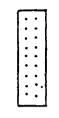


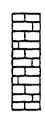












GANIC SOIL

CLAY

SILT

\_T SAND

GRAVEL

SHALE

SANDSTONE LIMESTONE

TUBE SAMPLE

SS = Split Spaon Sample

00 =

o = Dry unit weight in pounds

per cubic foot

A = Auger Sample

WC = In situ water content

N \* Penetration Resistance in Blows per Foot - by driving 2" O.D. Split Spoon Sampler

a distance of 12 inches with a 140-pound weight freely falling 30 inches

V = water level at end of boring

▼ = water level after elapsed time interval

Viwater level while Drilling

Qua Unconfined compression strength in Tons per Square Foot

\* - Denotes strength was based on pocket penetrometer measurements. Maximum range = 5.0

MATERIAL

BOULDER

COBBLE

Coarse GRAVEL

Medium GRAVEL

Small GRAVEL

Coarse SAND

Medium SAND

Fine SAND

SILT or CLAY

SIZE RANGE

Over 8 inches
8 inches to 2-1/2 inches
2-1/2 inches to 1 inch
1 inch to 3/8 inch
3/8 inch to No. 4 sieve
No. 4 sieve to No. 20 sieve
No. 20 sieve to No. 60 sieve
NO. 60 sieve to No. 200 sieve
Finer than No. 200 sieve

COHESIONLESS

CO	HESIVE	SOILS

_		
	•	
•	•	
	Classification	` N
	Very Loose	0 - 4
	Loose	5 - 9
	Firm	10 - 29
	Dense	30 - 49
	Very Dense	5.0 and over

SOILS

 Classification
 Qu

 Very Soft
 0.35

 Soft
 0.35 to 0.59

 Stiff
 0.60 to 0.99

 Tough
 1.00 to 1.99

 Very Tough
 2.00 to 3.99

 Hard
 4.00 and lover

MAJOR MODIFIER: SILTY, SANDY, CLAYEY, GRAVELLY

Modifying Term	Per Cent by Weight
Trace	. 1 - 10
Little	10 - 20
Some	20 - 35
And	35 - 50 .

#### TESTING SERVICE CORPORATION UNIFIED CLASSIFICATION CHART

				HOUP SYMBOLS AND	s	OIL CLASSIFICATION
	GROUP	MAMES 1	USING LAB	DRATORY TESTS *	1704P	GROUP NAME
- GRAINED SOILS % relained on Mo. 200	GRAVELS	CLEA	M GRAVELS	C <sub>4.2.</sub> 4 end 1 ≤ C € ≤ 3 °	64	Well graded gravel
	of course fraction retained	Less then 5%		C4 <4 and/or 1> C4 > 3 4	. 69	Foorly graded gravel
	en No. 4 sieve .	GRAVELS WITH FINES More than 12 % fines c		Fines closely as ML or MH	вм	Silty gravel f.g.h
				Fines classify 46 CL or CH	ac	Clayer gravel f,q,h
	SANOS	CLEAN SANOS		C, > 6 and 1 = C, =3 *	sw	Woll-graded sand !
2 3	50 % or more of course fraction passes No. 4	flass th		Cu 4 6 and/or 1 >> Cc >> 3*	. SP	Pearly graded sand !
¥ 94 .			WITH FINES	Fines classify as ML or MH	. 34	Silty send g,h,f
i	sieve	Mare then 12 % fines		Finos classify as CL or CH	sc	Clayer sand g,h,f
0	SILTS & CLAYS			>7 and plats on or above "A", line j	cL	Leen clay h.j.m
Ne. 200	Liquid   mi   less then 50 %	Ingraanie	₽I≺	4 or plots below "A" line }	WL	gile %,i.m
:		Organic	Line Uge	id limit—aven dried < 0.73	0.	Organic clay bilimin Organic sits bilimin
, acc posite	SILTS & CLAYS		P I al	ats on or above "A" line .	. сн	Fot clay kilim
*	Liquid limit 50 % or more	inerganic . PI		ots below 'A' Hae	мн	Electic six \$1,00
9		Organic	<u>Liqui</u> Liqui	d Hmit - oven dried. <0.75	. Он	Organic etay k,l,m,p Organic ailt k,l,m, a
light o	organic soils	Primority	weenle melt	or,dark in color, and organic adar	PT	Peat

a. Based on the material passing the 3-in (75-mm) sleve...

It fluid tampie contenned coobles and/or boulders, add with cobbles and/or boulders, add with cobbles and/or boulders are group acme.

Greate with 3 to 12 % fines require duel symbols

GW-GW well greated gravel with city

GW-GW well greated gravel with sitt

GW-GW poorly greated gravel with sitt

GP-GW peorly greated gravel with sitt

GP-GC poorly frated gravel with sitt

SW-SW well greated and with alt

SW-SW well greated and with clay

SP-SM poorly greated send with sitt

SY-SC poorly greated send with sitt

SP-SM poorly greated send with sitt

SP-SM poorly greated send with clay

C<sub>4</sub> \*D<sub>60</sub>/D<sub>50</sub> C<sub>6</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>6</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>7</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>8</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>8</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>9</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>9</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>1</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>2</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>1</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>2</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>3</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>3</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>3</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>4</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>5</sub> \*  $\frac{(030)^2}{00^2}$  C<sub>6</sub> \*  $\frac{(030)^2}{00^2}$ 

10

20

30

50 94 42 (FI) MH OR OH 04 رب 10 ML o ٥٤ EL-ML

t. If Alterborg Limits plot in herched area, soil is a CL-ML, slifty step.

Lift soil contains 15 to 29 % plus No. 200, add "with now" are "with gravel whichever is predominant.

Lift soil contains ≥ 30 % plus No. 200, predominantly sand, add "sandy" to grown name.

It sail contains ≥ 30 % plus No. 200, predominantly gravel, add "gravelty" to grown name.

aPI≥ 4 and plots on are above \$\frac{\pi}{2}\$ line.

aPI≥ 4 or plots below \$\frac{\pi}{2}\$ line.

aPI plots on or deave \$\frac{\pi}{2}\$ line.

aPI plots below \$\frac{\pi}{2}\$ line.

aPI plots below \$\frac{\pi}{2}\$ line.

60

•	PR	OJE	Tت	EST :	BORIN	GS & H	OTINO	RING	STATI	ONS,	BLACKWELL FOREST FRESERVE
•	CL	JENT		FORES	T PRE	SERVE	DIST.	OF I	DU PAC	E COU	NTY, 881 W. ST. CHARLES RD., LOMBA
											DATE COMPLETED 5-9-80 JOS 17,45
					ELEY	ATIONS	.*				WATER TABLE
	_ GR	מטט	o su	RFACE	·						AT END OF BORING 13.0'
$\mathcal{L}_{\mathcal{L}}$										•	24 HOURS
hlo !		<u>`</u>									WHILE DRILLING 14.5'
	<i> </i> //	ST.			,		<del>,</del>	<u> </u>	r	r	SHEET 1 OF
610		REC		MPLE	N	WC	Q,	ORY	OEPTH	ELEY.	SOIL DESCRIPTIONS
C 0-	7.								0.5		FILL - Black clayey TOPSOIL
			1 <sub>b</sub>	SS	12	26.7 29.0					FILL - Brown silty CLAY, trace sand & gravel (CL)
	6/06		2 <sup>8</sup>	SS	7	25.8			4.0		Saud d graver (CL)
5		M	3 <sup>a</sup> b	SS	24						Firm brown to light brown clayey
	1/0/	M	Ъ	33	24	!			7.0		SAND & GRAVEL, moist (SC)
			4 <sup>a</sup> b	ss	25						
10-			5a	SS	10		<u>.</u>				Firm brown to light brown silty fine to coarse SAND & small to
		X	6a	SS	20			İ		İ	large GRAVEL, very moist to wet
모		M	7a b	ss	16						at 14.5' (SM/GM)
15-									15.0		
Surface in Feel		X V	8 <sup>2</sup> b 9 <sup>2</sup> b	SS SS	22 40						Firm to dense brown to light brown fine to coarse SAND & small to large GRAVEL, wet (SW/
Surfa	-								20.0		
. ₃ ∠∪	-12		10 <sup>a</sup> b	SS	16	9.7	4.5*		20.0		
Distance Beloi	1/	X.	ll <sub>b</sub>	SS	38	9.4	4.5+ 4.5+				
9 <u>5</u> 25-	14	$\mathbb{X}$	12 <sup>a</sup>	ss	5/5"	**9.1 9.2	4.5+ <sup>3</sup>				Hard to very tough gray very silty CLAY, little sand & grave
	17	$\mathbb{N}$	13 <sup>a</sup>	ss	38	9.2 8.3	4.5+				moist (CL); occasional clayer silt layers; boulder at 25';
	7/	X	14a	SS	35	10.1					2" wet sand seam at 29.0'
30-		M	15 <sup>a</sup>	ss	40	1	4.5+	¥			
			16ª	ss	28	13.1					
•	-12		b La			12.6	4.25		33.5		
35–			Ъ,	SS	34						Dense to very loose gray fine
		M	18 <sup>a</sup>	SS	WOH						SAND, trace silt, wet (SP)
	- (1)	$\mathbb{X}$	19 <sup>a</sup> b	ss	8	14.6	1.75	*	38.5		Tough gray very silty CLAY, 1:
40-	$\exists \emptyset$	Y.	20a			ř <u>†</u> 3.9	1.5*		<u> </u>		sand & gravel, moist
40	WOH **	- DE	eig ivi	ht of	Hamm Boul 72	er der		TEST	ING SE	RYICE	-Approximate unconfined compres strength based on measurements a calibrated pocket penetromete

<u>م</u> ب	PROIF	CT TEST	BORIN	GS & H	ONIT	ORING	STATI	CONS,	BLACKWELL FOREST PRESERVE
•	CLIEN	r FORE	T PRE	SERVE	DIST	. OF I	U PAC	E COU	INTY, 881 W. ST. CHARLES RD., LOWBER
	BORING	Sta.	8 con	COATE	STAR	T.ED	5-7-8	30	DATE COMPLETED 5-9-80 JOS 17.458
,			ELEYA	ZHOITA		,			WATER TABLE
ও <sup>৻০ৢৢৢৢৢৢৢৢৢৢৢ</sup>	GROUN	D SURFAC	ε	<del> </del>					AT END OF BORING 13.0
(3 1)	END O	F BORING							24 HOURS
(5)0.	> ¤								WHILE DRILLING 14.5' SHEET 2 of 2
O	ENGTH ECOVE	SAMPLE	N	WC	Q,	<b>X</b> DRY	ОЕРТН	ELEY.	1
40-	10 FIVE	NO. TYPE		12.7	2 5×				Very tough gray silty CLAY, little
		1 _1		12.7	د. ي		,,,,		sand & gravel, moist (CL); with
		21 SS	26				42.0		layers of silt & sand from 41.0'
1		a			a e*				Firm to dense gray fine to coarse
. 44_		22 SS	43	17.0	2.3		44.5		SAND & small GRAVEL, wet (SW/GW) very tough gray silty clay layer
77-	J. J. Y	23 <sup>a</sup> SS	30/2"	:					at 43.0'
<u> </u>	- N. W.	k2 <sup>p</sup>   33	10,2	!			47.0		Very dense gray sandy SILT, trace
									clay, some large gravel, wet (ML)
		•							Weathered light gray DOLOMITE
50_				:					or BOULDER
								Ì	-Approximate unconfined compression
	4 11	End of	Borin	g at S	1.0'				strength based on measurements wi
	4 11							· ·	a calibrated pocket penetrometer.
_ 55-	-	Bottom	of sh	allow	moni	orin	well	was	
# #	- 11	install 3.0' to	led at	39.0'	face	Sear	ed IIC		
w Surface in Feet	7 11	1 1	1						
Joce	]	Bottom	of de	ep mon	itor	ing w	ell wa	s	
رمه وي د مه	<u> </u>	instal: sealed	above	42.0	en o	1 4/-	and	1	
<u>}</u>	4 11								·
Distance Below	4 11			ŀ					
,	- 11						}	1	
	7 11			<u> </u>			1		
<sup>△</sup> 65	7		İ						
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	7								

PROJECT TEST BORINGS & MONITORING STATIONS, BLACKWELL FOREST PRESERVE FOREST PRESERVE DIST. OF DU PAGE COUNTY, 881 W. ST. CHARLES RD., LOYBART DATE COMPLETED 4-23-80 BORING Sta. 11+160 DATE STARTED 4-23-80 JOB 17,458 ELEYATIONS WATER TABLE -14.0' AT END OF BORING GROUND SURFACE \_\_ 24 HOURS\_\_\_ END OF BORING\_ While Drilling -13.0' SAMPLE WC DRY DEPTH ELEY. SOIL DESCRIPTIONS N NO. TYPE FILL - Black clayey TOPSOIL 0.7 FILL - Brown silty CLAY, little 21.3 1.4 SS 118 sand and gravel (CL) 22.3 FILL - Dark gray clayey SILT, 3.0 trace sand and gravel SS 119 Firm to dense light grayish-SS 38 brown fine to coarse SAND and small to medium GRAVEL, trace 27 SS silt and clay to 5', damp (SW/GH) SS 22 11.0 10 Firm to loose brown fine SAND, 2 moist to wet at 13' **(S2)** 又 SS 7 Distance Below Surface in Feet SS 16 16.0 Firm brown fine to coarse SAND, little to some small to medium 23 SS gravel, vet 18.5 30 SS 24 Firm gray small to large GRAVEL and fine to coarse SAND, wet 28 (G4/54) SS 30 SS 31 SS 36 End of Boring at 31.0 feet Gas was endountered below 9.0' Boktom bf Monitoring Well was installed at a depth of 28.5 feet and sealed from 3.D feet to ground surface.

TESTING SERVICE CORPORATION

PROJECT TEST BORINGS & MONITORING STATIONS, BLACKWELL FOREST PRESERVE CLIENT FOREST PRESERVE DIST. OF DU PAGE COUNTY, 881 W. ST. CHARLES RD., LONGARY BORING Sta. 17 DATE STARTED 5-19-80 DATE COMPLETED 5-19-80 JOBL 7.458 ELEVATIONS WATER TABLE GROUND SURFACE \_ AT END OF BORING \_\_\_ END OF BORING \_\_\_ 24 HOURS ... While Drilling -13.0' SAMPLE DRY DEPTH ELEV. WC SOIL DESCRIPTIONS NO. TYPE FILL - Black clayey TOPSOIL 1.2 88/10" SS Very dense brown clayey small to large GRAVEL and fine to coarse SAND, occasional cobbles. 100/4 SS (GC/CL) 24.3 3.0\* 5.0 Very tough brown silty CLAY, 16 SS 6.0 trace sand and gravel, moist(CL) 21.5 Firm brown to reddish-brown clayey medium to coarse SAND & small GRAVEL, moist (CL SS 16 9.0 SS 19 Firm to very dense brown fine to coarse SAND, trace clay, SS 21 moist to wet at 13.0' (SW) 14 SS Distance Below Surface in Feet 66/1D" SS SS 43 19.0 19.1 Loose gray SILT, very moist (ML) SS 8 20.2 with seams of silty clay 21.0 SS 78 Very damas to firm gray small SS 118 to large GRAVEL, fine to coarse SAND and COBBLES, wet (GH) SS 19 49 SS SS 36 19.8 30.5 Dense gray clayey SILT, very End of Boring at \$1.0 feet moist Bottom of monitoring well was installed -Approximate unconfined compres at a depth of 29.0 feet and sealed from strength based on measurements 2.D feet to ground surface. a calibrated pocket penetromete:

TESTING SERVICE CORPORATION

PROJECT TEST BORINGS & MONITORING STATIONS, BLACKFELL FOREST PRESERVE CLIENT FOREST PRESERVE DIST. OF DIL PAGE COUNTY, 881 W. ST. CHARLES RD תמג באנו ז DATE STARTED 5-13-80 DATE COMPLETED 5-13-80 \_ Jos <u>1</u>7,450 ELEVATIONS WATER TABLE -16.0' AT END OF BORING\_ 24 HOURS\_ -15.0' While Drilling Sheet 1 of 2 SAMPLE DRY DEPTH ELEV. WC SOIL DESCRIPTIONS NO. TYPE FILL - Brown and gray silty CLAY, little sand and gravel 21.5 SS 22.1 (CL) 3.5 30.4 22 SS Firm to dense grayish-brown fine to coarse SAND and small to large 32 3Ы SS GRAVEL, trace silt to 15.0', moist to wet at 15.0' (SW/GW) 28 SS 5" clayey sandy silt seam at 11.0 4ъ SS 12 SS 16 SS 23 Distance Below Surface in Feet 15-Q 88 SS 31 18.0 SS 17 Firm gray SILT, little to some fi 19.0 sand, trace clay, wet (江) SS 11 Loose to firm gray clayey SILT, 39:8 little fine sand, very moist (ML) 114 SS 13 Firm reddish-brown fine to coarse SAND, little gravel, wet 124 SS 20 Firm brown fine to coarse SAMD and small to large GRAVEL, wet (S7/G7) 134 27.0 SS 28 Firm brown fine to coarse SAND, 141 SS 22 little to trace small to medium gravel, wet 23 158 SS 165 SS 23 SS 34 SS 27 Very tough grayish-brown silty SS 51 CLAY, little sand and gravel, 39.0 (CL) moist 26

TESTING SERVICE CORPORATION .

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	•		PRO.	JECT_	TEST	BORIN	IGS & I	MONIT	ORING	STATI	CONS,	BLACKWELL FOREST PRESERVE
•												NTY, 881 W. ST. CHARLES RD., LOYS.
			BORI	ING	Sta.	13	_ DAT	E STAR	TED_	5-13-8	30	DATE COMPLETED 5-13-80 JOB 17,0
						ELEY	'ATIONS					WATER TABLE
•	185	. 1	GRO	וצ סאט	JRFAC	ε	<del>,</del>		<del></del>			AT END OF BORING -16.0'
1	113D	ı	END	OF 80	DRING.		+ -			<del></del>		24 HOURS
1	1191		_	¥								While Drilling -15.0'
			67.1	٢٠٦	MPLE	T		Τ_	L	<del></del>		SHEET 2 of
	40-		L EX	~ I	TYPE	N	WC	Qu	M DRY	ОЕРТН	ELEY.	SOIL DESCRIPTIONS
	40-		狐	20ъ	SS	16	13.1	4.5÷				Hard to tough brownish-gray to
		_]/	λN	a			13.3	3.50	ţ ,			gray silty CLAY, little to some
		-46	1	21ъ	1	33	13.2	4.25				sand and small gravel, moist (
		-		а 22b			12.5			•		6" sandy silt seam at 39.5'; sa pockets from 45-47'
	45_				1			1.50				position 1101 45 4.
		11/2	JW.	23b	1	35	14.2					
		T	W	a		ļ ,		3.75				·
		J/.	火	24b	1	36	12.8					
	50-	1/	ΔŊ	25b		43	14.6	2.00		50.0		
			$\mathcal{X}$	3	İ	43				51.0		Dense gray SILT, trace fine san (ML)
		1	111	а 26ъ	L	22	18.6	2.00				Layers of very tough gray silty
			4	a			19.1	2.25		53.5		moist (CL) and firm gray clayey very moist (ML) occasional sand
				27ъ	SS	116/1	0"			54.2		Silt seams Dense gray medium to coarse SA:
	55-											and small GRAVEL, wet (SW); 3"
	ñ,						<u> </u>		<u> </u>			very dense sandy silt seem at '   Weathered light gray DOLOMITE of BOULDER
	Distance Below Surface in Fact	$\dashv$										BOULDER
	o Ju	4		End	of t	pring	at 5	.0'				- -Approximate unconfined compressi
	3 60 ·	-										strength based on measurements
٠,,	3elo	7					llow to				was	a calibrated pocket penetrometer.
	g e						.0' to				<u> </u>	
	1 ton				L					ļ ,		·
	<u>ة</u> 65	_					p mon:					
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PROJECT LEACHATE MONITORING WELLS, BLACKWELL FOREST PRESERVE, DUPAGE COUNTY, ILL. FOREST PRESERVE DIST. OF DUPAGE CO., P.O. BOX 2339, GLEN ELLYN, ILL. JOS 18,766 DATE COMPLETED 5-03-82 DATE STARTED \_4-29-82 G-121BORING\_ ELEVATIONS WATER TABLE 702.2 AT END OF BORING CAVE @ - 5.0 FEET GROUND SURFACE \_\_ 682.2 END OF BORING\_ 24 HOURS\_ WHILE DRILLING - 9.5 FEET SAMPLE WC DRY DEPTH ELEY. N Q, SOIL DESCRIPTIONS NO. TYPE Black clayey TOPSOIL 0.6 701.6 SS 16 Stiff brown sandy CLAY, some silt, 2.0 700.2 some gravel, moist (CL) 9 SS Loose brown fine SAND, gravel, damp little small 4.0 **5**98.2 Dense light brown small to large GRAVEL and medium to coarse SAND, 又 5~ SS 33 damp 6.0 596.2 Very dense brown sandy (medium to coarse) small to large GRAVEL and SS .75 8.0 594.2 COBBLES, a few boulders, damp(GW) 48 SS Dense brown medium to coarse SAND and small to large GRAVEL, a few 10.0 592.2} boulders, saturated (SW-GW) 6 .SS 33 Dense to firm brown medium to coars SAND and small to large GRAVEL, a SS 11 few boulders, saturated (SW-GW) SS 29 16.0 586.2 Firm brown sandy coarse small to large GRAVEL and COBBLES, a few boulders. saturated (GW) SS 21 Distance Bolow Surface In boulders, saturated ДΟ SS 16 End of Boring at -20.0 Feet NOTES: The bore hole for the monitoring well installation was made by the rotary nethod using revert. The well was backflushed with fastbreak and clear vateri. Bottom of plastic screen: top of plastic screen: 15 Gravel backfill from 20' to 6' 30-Bentonite delleds from 6' to 4' Backfill above bentonite Well purged with subhersible pump on May 4, 1982 35-

LEACHATE MONITORING WELLS, BLACKWELL FOREST PRESERVE, DUPAGE COUNTY, ILL. PROJECT FOREST PRESERVE DIST. OF DUPAGE CO., P.O. BOX 2339, GLEN ELLYN, ILL. CLIENT\_\_\_ 18,766 DATE STARTED 4-29-82 \_ DATE COMPLETED\_4-30-82 ELEVATIONS WATER TABLE 704.8 AT END OF BORING \_\_ -11.0 FEET -GROUND SURFACE \_\_\_ 678.8 END OF BORING\_ 24 HOURS\_ WHILE DRILLING -15.0 FEET SAMPLE WC DRY DEPTH ELEY. N Q. SOIL DESCRIPTIONS NO. TYPE 1b 0.5 04.3 FILL - Black clayey TOPSOIL 8 SS 1.5 03.3 FILL - Brown clayey fine to medium SAND, little silt, moist(SC) 2a SS 19 FILL - Brown silty CLAY, little 3.5 01.3 sand and gravel, moist 3<sub>b</sub> SS 37 FILL - Brown, black and gray silty CLAY, little sand and gravel 699.3 5.5 moist (CL) SS 34 FILL - Brownish-gray silty CLAY, trace gravel, occasional sand seams, moist (CL) 8.0 696.8 SS 19 5 3" sand and gravel seam @ -5.5' 10 10.0 694.8 SS 6 10 FILL - Brown sandy CLAY, some silt, little small gravel, moist 모 12.5 692.3 7 SS 31 Firm gray light brown and brown sandy SILT, some small to medium gravel, moist 14.0 590.8 (ML) Distance Below Surface in Feet 0 SS 31 8 Dense gray medium to coarse SAND and small to large GRAVEL, very SS 26 9 moist (SW-GW) Dense to firm gray coarse SAND and small to large GRAVEL, saturated 10 SS 20 19.0 685.8 Firm brown coarse SAND and small to large GRAVEL, saturated(SW-GW) SS 23 11 22.0 582.8 12 SS 19 Firm to dense light brown fine coarse SAND and small to medium GRAVEL, saturated (SW-GW) 13 SS 31 End of Borink at -26.0 Feet The bore hole for the monitoring well installation was made by the rotary method using revert The well was NOTES: 30 backflushed with fastbreak and clear water. Bottom of plastic screen: Top of plastic screen: 20.5'
Granular naterial caved around pipe to 15' 35 Well purged with submersible pump on May 4, 1982

LEACHATE MONITORING WELLS, BLACKWELL FOREST PRESERVE, DUPAGE COUNTY, ILL. PROJECT FOREST PRESERVE DIST. OF DUPAGE CO., P.O. BOX 2339, GLEN ELLYN, ILL. CLIENT. G-123DATE STARTED 4-29-82 DATE COMPLETED 5-03-82 JOB 18,766 BORING \_\_ ELEVATIONS WATER TABLE 706.2 GROUND SURFACE \_ 682.2 END OF BORING\_ 24 HOUR'S WHILE DRILLING -12.0 FEET LENGTH RECOVERY SAMPLE MORY DEPTH ELEV. WC SOIL DESCRIPTIONS NO. ITYPE 0.5 705.7 |FILL - Black clayey TOPSOIL SS 39 704.7 1.5 FILL - Gray small to large GRAVEL 2.0 704.2 some coarse sand, moist(GW) 2<sub>b</sub> 27 SS FILL - Gray silty CLAY, trace gravel 3.5 702.7 (CL) · moist FILL - Brown silty CLAY, li 3 53 SS 5.5 6.0 700.7h gravel, moist 700.2 93 SS Very dense brown small to large GRAVEL, some coarse sand, damp (GW) ٠5 49 SS Very dense light brown large GRAVEL and COBBLES, little sand, damp (GP) 6 SS 64 Very dense to dense light brown 又 12.0 694.2 small to large GRAVEL, COBBLES, 7 SS 39 BOULDERS and fine to coarse SAND, (GW-SW) 8 SS 33 Dense brown fine to coarse SAND and small to medium GRAVEL, satu saturate k..ce Below Surface in Feel 690.4 16.0 (SW-GW) 9 150/6 17.0 689.3 Very dense brown fine to coarse SAND and small to large GRAVEL, saturated (SW-GW) 50. 10 SS 20 Dense to firm brown and gray medium to coarse SAND and small to large SS 22 111 21.5 684. GRAVEL, saturated (SW-GW). 22.5 683. 125 SS 46 Firm gray SILT, trace sand, saturate Dense gray small to large GRAVEL and 25 COBBLES, some coarse sand, saturated End of Boring at -24.0 Feet The bore hole for the monitoring well installation was made by the rotary method using revert. The well was backflushed with fastbreak and clear NOTES: 30 Bottom of plastic streen: 21.5 Top bf plastic screen: 15.5' Granular Hackfill from 21,5' to 7' Bentonite bellets from 7' 35 Backfill above bentonite Well purged with submersible pomp on May 4, 1982

7	•				,	RT ACK	ा प्राप्त	FOREST	ישסם י	CEDUE		•	_			
C	•	•	•									T 44		_		
													, P. O. 2339, GLEN FILYN, TILINOIS			
					-			· .		TED_	0-10-	-04	DATE COMPLETED 6-18-84 JOB 20,53	<u>~</u>		
								ATIONS				•	WATER TABLE			
													AT END OF BORING	-		
			END	0	F BO	RING	0)7.	<del></del>	68	33.4	<del></del>		24 HOURS -10.0 Feet	_		
			2	VERY	LOCATION: 2 + 56 S 11 + 18 W								WHILE DRILLING			
•		<u>،</u> -		RECO		MPLE		.WC	Q,	<b>FORY</b>	DEPTH	ELEY.	SOIL DESCRIPTIONS			
	i		12	$\langle \bot$	1 <sup>A</sup> B	ss	18	18.1 26.9			1.5	701.9	FILL: Dark brown clayey TOPSOIL (OH)			
		_			2 <sup>A</sup> B	SS	45	19.9	٠	·	3.0	700.4	FILL: Brown silty CLAY, some sand, trace gravel (CL)			
		- 5			3	I .	85						Very dense brown fine to coarse			
		-		-	4	SS	50/5"	!					SAND and small to large GRAVEL, occasional cobbles and boulders,			
		-			5	SS	50/6"						moist to wet; 4" silt seam encountered at 8'	j		
	2_ 1	0					_				10.0	693.4	(SW-GW)			
		-		-	6	ŞS	24				•		Firm grayish-brown medium to coarse SAND, little gravel,			
		-		\_	7		13				•		wet (SP)			
	Į.	15— —	0.		8	SS	15				16 0	687.4				
•	w Surface in Feel	- -			. 9	SS	20	•	٠.			007.4	Firm to dense gray and brown fin to coarse SAND and small to larg GRAVEL, occasional thin silt			
	r Surf	- 20		1	10	SS	42						seams, wet (SW-GW)	_		
, <b>•</b>	Distance Below	-	1			End	of Bo	ring	at -	20.0	Feet			•		
	2 × ×	-	-			MONI	ORIN	G WELL	NOTE	s						
	_	25	1			1.	Bore	hole	made	by h	llows	tem a	uger method.			
		_	]	1		2.	Bott	pm of	10' 1	vc s	reen	at 17	3/4'.			
		_	1			3.	Grav	el pac	k fro	m 17	3/41	to 4'	4			
			-			1		pnite	ľ	1	l	1	· .			
		30—	-			į	1	1.	[	1	ł	1	d into			
		· -	1					e over								
		_	}													
		35	-													
		-	1										·			
		-	1													

TESTING SERVICE CORPORATION

PROJECT\_ BLACKWELL FOREST PRESERVE FOREST PRESERVE DIST. OF DU PAGE CO., P. O. 2339, GLEN ELLYN, ILLINOIS CLIENT\_ DATE STARTED 6-18-84 DATE COMPLETED 6-18-84 JOB 20,530 G-127BORING \_ WATER TABLE ELEVATIONS 705.0 GROUND SURFACE \_ AT END OF BORING \_\_\_ 685.0 END OF BORING 24 HOURS\_ LOCATION: -11.0 Feet 3 + 05 SWHILE DRILLING\_\_\_ 14 + 05 W SAMPLE SOIL DESCRIPTIONS .WC DRY DEPTH ELEV. N NO. TYPE FILL: Dark brown clayey TOPSOIL. SS 61/9 17.2 15" 703.8 trace sand and gravel (OE) 17.7 FILL: Brown, gray and black silt SS 27 CLAY, some sand, little gravel (CL) 22.1 3 SS 16 Clayey sand and gravel layer encountered at 3.5' 6.5 | 698.5 21.1 SS 15 (Sample 2B) Brown silty CLAY, trace sand 8.0 1697.d and gravel, moist (CL) SS 34 Dense brown fine to coarse SAND 10.0 695.d and small to large GRAVEL, moist V\_ SS 32 21.2 (SW/GW) 693.0 12.0 Dense brown and gray SILT, trace 22.3 1.75 692.0 clay and fine sand, very moist; 13.0 SS 21 occasional wet sandy silt seams (ML) SS 22 Tough gray silty CLAY, moist (C. occasional thin wet sand seams 34 SS Firm to dense brown to brownish gray fine to coarse SAND and SS 30 GRAVEL, wet (SW/GW) End of Boring at - 20.0 Feet -Approximate unconfined compression strength based on measurements wi a calibrated pocket penetrometer. Poor sample; driving on piece. of gravel. MONITORING WELL NOTES Bore hole made by solid auger method and reamed by rotary method using 6" bit and Revert. 2. Bottom of 10' NVC screen at 19'. 30 -Backflushed with clean water. 4. Gravel padk from 19 to 8'. 5. Bendonite pellets from 8.0' to 2.0'. Steel projective pipe concreted into place 35over well casing.

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<b>•</b>	•	· Pi	ROJE	CT_	BLAC	KWELI	FORES	T PR	ESERV	E DY B	70.70	P. O. 2220 OVEN PLIEN THE TWO YES
			LIEN									., P. O. 2339, GLEN ELLYN, ILLINOIS
		80	ORIN	c	G-12	8	_ DAT	E STAF	RTED_	6-19	9-84	DATE COMPLETED 6-22-84 JOS 20.530
			•			ELEV	ZHOITA	•			•	WATER TABLE
		ĢR	ROUN	ED SU	IRFAC	E		705			•	AT END OF BORING
		٤۶	10 0		RING_ OCATI		1 + 8	649	. 9		•	WHILE DRILLING -11 1/2 Feet
			H.		JUALL		17 + 1		•			SHEET 1 OF 3
	0		L ENGT	SA NO.	MPLE TYPE	И	.WC	Q,	YDRY	<u> </u>	ELEY.	
	-		$\bigvee$	1 <sup>A</sup> B	SS	20	27:7			7"	705.3	Black clayey TOPSOIL, trace sand and gravel (OH)
			W-	2	SS	34				4.0	701.9	Firm to dense brown gravelly (small to large) fine to coarse SAND, moist (SW)
	5——	$\mathbb{Z}$	X	3	SS	27	18.6	2.5*		6.0	699.9	Very tough brown silty CLAY.
			X	4	SS	51						
	10	0	$\mathbb{X}$	5	ss	48 .	,					
	<u></u>	Ū		6B	SS	40						Dense to very dense brown fine to coarse SAND and small to
	=	0	X	7	SS	41			•			large GRAVEL, a few cobbles, occasional boulders below 14', moist to wet
100	15	0	X	8	SS	71	·					. (SW/GW)
Surface in Feel				9	ss	63				17.7	688.2	
•	20—		$\bigvee$	10B	. ss	62				18.8	687.1	Very dense gray SILT, trace clay and sand, very moist (ML)
Below		Î.		11	ss	66						
Di stance	_		X = X	12	SS	58	·					Very dense to dense gray fine to coarse SAND, small to large
۵	25—	7	X	13	ss	46						GRAVEL and COBBLES, wat (SW/GW)
	_		$\mathbb{X}$	14	SS ·	50			·	1,, ,	677.7	
	30—	W	X=	15	ss	16				20.2	077.7	•
				16	SS	48	:					Firm to very dense gray sandy
			X	17	SS	75						SILT, some gravel, trace clay, moist (ML)
	35		$X_{-}$	18	SS	60	•					
			X_	19	SS	43						
			$X_{\perp}$	20	ss	32	i					

Distance Bolow Surface In Feet 80 75 50 6 GROUND BORING CLIENT END OF PROJECT RECOVERY 21 NO. TYPE BORING SURFACE SAMPLE G-128 cont. FOREST PRESERVE DIST. BLACKWELL FOREST PRESERVE SS SS MONITORING WEL End G Bdring Of. LLS 65 ELEVATIONS 21 ç 12\$D z 91 Bering pleted by initially חדס teel ravel NSTALLED ackflushed otton entonite s Reve DATE (Installed œ ₹ w ซ Lace prote pack of 1 ÿ 3.5\* at NOTES STARTED 649.9 Q 705.9 the YDRY TESTING pver CTIVE Ling 56. with idvan fron ន្ត ነላ H DU PAGE ced b 6-19-84 PVC n otary 43.5 HLABO Feet pipe 54.5 original from clean SCT SERVICE 2 662.9 663.4 methdd methdd ELEY. 611 ca een a 401 concreted wat co. G WHILE DRILLING DATE CORPORATION sing. 0 'n ore hole) AT END OF 54.5'. . using auger, strength based Approximate Very Firm SILT, moist BEDROCK calibrated COMPLETED 0 2339, а 6:1 שהנ dense g BORING SOIL Some very (Dolomite) See Sheet 3 Completion **SEL S** DESCRIPTIONS WATER TABLE gray gravel, unconfined pocket 6-22-84 dense ELLYN, silty GRAVEL, Ï easurements penetrometer. trace gray 1/2 SHEET w of No 3 e o JOB 20,530 ILLINOIS Feet sandy Notes clay, 2 05 pression 80 C w

DRILL RIG

NO.

TESTING SERVICE CORPORATION .

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د. ج								FORÉST					
	•		CL	IEN	τ1	FORES	T PRE	SERVE	DIST	OF	DU PAG	E CO.	, P. O. 2339, GLEN ELLYN, ILLINOIS
													DATE COMPLETED 6-25-84 JOB 20,530
							ELEV	ZHOITA					WATER TABLE
			GR	100	ND SU	RFACE	:		700	.9			AT END OF BORING
			EN	0 0	F BO	RING_			682	.9	_		24 HOURS
				. >		CATI		1 + 7	70 N				WHILE DRILLING -8.0 Feet
				7 2 2				20 + 3	35 W		•		·
	0-	•		L RNO		MPLE TYPE	N.	.WC	, -	X DRY	DEPTH		
		-	1/	$\mathbb{V}$	1 <sub>B</sub>	SS	.9	29.9 22.2			0.5	700.4	Black to dark brown clayey TOPSOIL (OH)
		-	17		A			30.5	1.25	1.			Very tough to tough brown silty
				X	2 <sup>A</sup> B	SS	38	21.9			3.0	697.9	CLAY, trace sand, gravel and organic, moist (CL)
	5-	-		X	3	SS	8	21.5	-				Brown sandy silty CLAY, Little
		7		$\chi_{\perp}$	4	SS	9	22.4	-				gravel, moist (CL)
	<b>V</b>	┪		V	5	SS	75				8.0	692.9	
	10-			$\sqrt{}$	] ]	33	15					·	Town dance to firm the fire
	10-	_		X	6	ss	77					•	Very dense to firm gray fine to coarse SAND and small to
		-		V.	7	SS	30						large GRAVEL, a few cobbles, wet; 3" clay seam at 13 1/2'
			//	$\Lambda$	]	. 22	30			_			·
	_ 15-			X	8	ss	26	•					(SW/GW)
U	6 6 L	-		V		cc	60		·			·	
-	<u> </u>				9	SS	60						
	Surface in Feel					T-3	6 8	ring		100	Foot		•
•								}	ļ		reet		-Approximate unconfined compression strength based on measurements with
ء	Distance Below S	$\exists$						G WELL		Τ		١	a calibrated pocket penetrometer.
	9	$\dashv$				1.							y solid auger, y method using
ž	፱ ፭ <sub>25</sub> .	╛					a o''	bit a	nd Re	vert			
	2.5	$\exists$				2.	Bott	om of	10' 1	VC s	creet	at 17	7.5'.
		4				3.	Back	flushe	d wi	h cl	ean wa	ter.	
		ㅓ				4.	Grav	el pac	k fr	<b>dm 17</b>	5' to	6'.	1
	30-	$\Box$				5.	Bent	onite	pell	ets f	com 6	to 2	2 ' -
	50	$\exists$				6.		l pro:				crete	d into
		コ											
		4											
	35-	$\dashv$							]				
									1				
Y		4	}										
Ì	•	$\dashv$	Ì							1			

, JA	•	- p	RO:	ECT	BLAC	KWELI	FORES					
	•	_									GE CO	., P. O. 2339, GLEN ELLYN, ILLINOIS
					G -							DATE COMPLETED 6-25-84 JOB 20,53
			•				'ATIONS					WATER TABLE
		G	ROU	ND S	URFAC	٤	• .			<u> </u>		AT END OF BORING
		Ε:	ַ סא		ORING_		7 + 9	685	. 2			24 HOURS
		٠	7 E	E .	OCATI		17 + 3					WHILE DRILLING -14.0 Feet
	0		LENG	NO.	MPLE TYPE	1 N	.wc		<b>X</b> DRY	DEPTH	ELEY.	SOIL DESCRIPTIONS
	-	1	$\mathbb{W}$	1 <sup>A</sup> B	ss	12	56.2 22.9			0.7	707.9	Black to dark brown clayey TOPSOIL (OH)
	-	-1//	$\mathbb{X}$	2	ss	26	22.4	4.0*				Hard brown silty CLAY, trace
	5			3	ss	25	·			4.5	704.1	sand and gravel, moist (CL)
	-		X	4	SS	38						·
	٠			5	ss	58						
•	10	-13	$\forall$	,								Firm to very dense brown medium
			$\bigvee$	6	SS	48				• .	•	to coarse SAND and small to large GRAVEL, damp to wet
_	· 			7	SS	85	• .					(SW/GW)
7	15—		X	8	SS	88	,					_
in Feet	-		V	9	ss	18	<u>.</u>					
Surface In	-	]/,	M	10	ss	24						
•	20— -	- / · / ·	X	11	SS	34						•
Distance Balow	•		X	12	ss	71/11	.,					
stan	•	نندا	Ì			•						•
<u>ā</u>	25—				End	of Bo	ring	at -	23.4	Feet		-Approximate unconfined compressi- strength based on measurements w
	-	-			MONI	IORIN	G WELI	NOT	<u>:s</u> .			a calibrated pocket penetrometer.
	-	_			1.							y solid auger,
:	30	]					was co			y the	rotar	y method using a
	-	-			2	1	om of	i l		creen	ar 23	
	-	1			1		flush			i		
	_	]					el pa				}	
:	35—	_					onite				1	
	-	-			l	l i					ł	d into
	_	1					e ove					
	_	4							:			
	40-		Щ	<u> </u>	<u> </u>						<u> </u>	<u> </u>

	201	LIECT	BLACX	WELL	FORES	T PRE	SERVE	: מע	PAGE	COUNTY, ILLINOIS
<i>-</i>	CI IF	NT	FORES	T PRE	SÉRVE	DIST	TRICT	OF DU	PAGE	CO., P. O. BOX 2339, GLEN ELLYN, IL.
										DATE COMPLETED 4-8-85** JOB 21,288
•		_			ATION:			-		WATER TABLE
	GRO	UND	SURFAC					·	•	AT END OF BORING
	ENO	OF E	BORING .		6	61.5			•	24 HOURS
	:	ž	* Date	LOCAT	ION:	685. 1725.	.3 S .2 W			WHILE DRILLING
			* Date			1		1 .	1 .	SHEET 1 OF 2
	0	N	O. TYPE	_ N	wc	Qu	40RY	j	<u> </u>	SOIL DESCRIPTIONS
	-	<b>y</b> :	ı ss	15	31.9			0.5	704.0	FILL: Black clayey TOPSOIL (OL)
•	- 67 A		ss	50/3'	25.9	(TOP	·	2.5	702.0	FILL: Brown silty CLAY, some sand and gravel, trace topsoil (CL)
•	5	<b>X</b> =	ss	53						FILL or DISTURBED: Brown silty fine to coarse SAND and
		4	ss	70						small to large GRAVEL (SM/GM)
_1	320	<b>1</b>	s ss	50				8.5	696.0	· · · · · · · · · · · · · · · · · · ·
<u>V</u>		6	SS	42				•		Dense to firm brown fine to coarse SAND and small to medium GRAVEL, moist to wet
FEET		7		26						(SW/GW)
Z :	15	X <b>, 8</b>	33	1.11				16 2	600 2	·
SURFACE		9	ss	21	·			10.3	688.2	
₹		10	ss	28						Firm to dense brown to gray fine to medium SAND, little to trace gravel, wet (SP)
BEL		11	. ss	34	٠					to crace braves, and (ov)
DISTANCE		12	ss	24						
rsio	25	12	ss	87				24.0	680.5	Very dense to firm gray medium
		14	SS	29						to coarse SAMD and small to large GRAVEL with cobbles and
		\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	SS	72/8"						boulders, wet (SW/GW)
7			'							·
		/	A					31.5	673.0	
		17	B SS		14.2 16.6			,		Very tough to hard grav silty CLAY, little sand and gravel, moist (CL)
3	5	18	ss	44				35.0	669.5	Dense to firm layers of gray fine SAND and SILT, trace
\		19	A SS	26				38.0	666.5	gravel, moist (SP.ML)
\ 4		20	A SS	47						some gravel, moist (SM)

	Р	ROJ	ECT.	DLAL	シャクトト	. ruke.	סד גצת	こりにおく	ىد	בעהר	COUNTY TELEFORM
-	c	LIE	NT	FORE	ST PR	ESERV	E DIST	TRICT	OF DU	PAGE	CO., P. O. BOX 2339, GLEN ELLYN, II
											DATE COMPLETED 4-8-85** JOB 21 -289
						YATION:					WATER TABLE
	G	ROU	NO S	URFAC	ε		704.5				AT END OF BORING
_				ORING			61.5			•	24 HOURS
		;	>- E		LOCAT	ION:	685.3	S T₩	•		WHILE DRILLING: -10.5 Feet
		E .		* Dat		well d		tion (	T :=	1	SHEET 2 of 2
´4Ω		L ER	<u>- ا</u>	TYPE	I N	WC.	Q,	FORY	DEPTH	ELEY.	-
		X	201	SS	47						Firm to dense gray silty SAND,
	4	-M⁻	21	ss	50/3	, [		<u> </u>			some gravel, moist (SM)
	12	<b>1</b>			["						
· · ·	1	11	-				1				
45	H	7			1					ľ	
•								1			
•		] [								ļ ļ	BEDROCK: DOLOMITE, weathered
•		1			İ						near top
	K	11		1	1		<b>†</b>				-
50	卢	11	Ĭ			Í					· ·
•	15	1	,				i i				•
	F	11									-
		$\left[ \cdot \right]$		End	of Bo	ring	ar	-53.	) Feet		-
· 55—	_	П	l			i -	]	.			
	┨.			DRII	LING	AND M	DNITO	RING	WELL	IATZKI	LATION NOTES
- -	┥ `			TWO	WELI	S INS	TALLE	NI d	BEDRO	K:	
-	4	11		Ori	ginal	pilo	hol	sam	pled	ind di	illed by rotary method
	┪										cond hole was drilled
60 —	┥										eamed with an 8" bit-to ipe was installed in each
-	┪										was pumped through drill
-	1										ole. The entire annular
	]	П	Ì								pipe was filled with s for the grout to set,
65—	]	П									o rock with a 3 3/4" bit.
ـــرن	]			The	ope	hole	(in	rock	and	casing	for each well was flushed
_	]										steel protector pipe was
_				COT	cret	d int	o bra	ce oy	er ea	cn we.	 
-	-			G-1	31D						-
70—	-			1	Во	tom o	£ 8"	hole	and P	VC cas	ing: 43'
-	1			2		tom d					
_	1			G-	3100						
_	1			1		-rom d	£ 8"	hole	and P	VC ca:	ing: 53'
	1		.	2		com d					
75 —	1							•			
-	]				Í				-		
_	] .							.		-	-Approximate unconfined compress
_	1 1										strength based on measurements a calibrated pocket penetrometer.
	1 F	11	- 1	ŀ		1	1	· 1			a calibrated pocket penetrometer.

		PRO	)JE	ст <u>_</u> 1	BLACK	WELL	FORES	T PR	ESERVE	: DU	PAGE	COUNTY, ILLINOIS
		CLIE	NT		FORES	T PRE	SERVI	DIS	TRICT	OF DU	PAGE	CO., P. O. BOX 2339, GLEN ELLYN, IL.
		808	INC	; <u> </u>	G-132		DAT	E STA	ARTEO _	4-3-8	35	DATE COMPLETED 4-9-85** JOB 21,288
							ATION					WATER TABLE
											•	AT END OF BORING
		ENO	01	F 80	RING _	00177	·0¥-	631.	7 .9 ห			24 HOURS
			<u> </u>		, <u> </u>	OCAI I	.un:	544.	5 W Letion			WHILE DRILLING -23.0 Feet. SHEET 1 OF 3
				SAN	PLE	ŀ	1	T	ì	ì		1
	<u></u>		3 6		TYPE	N ·	wc	Qu	& ORY		<u> </u>	SOIL DESCRIPTIONS
	٠.	- M	$   \sqrt{} $	1	sś	NO I	ECOV	RY ·		0.7	724.0 723.2	FILL: Black claver TOPSOIL (OL) FILL: BOULDERS and COBBLES
	-		X	2	ss	55						
	<u>.</u> 			3	SS	53						
	-	K.L.	X	4	SS	64						Very dense to firm brown silty
	-	松		5	SS	62						SAND and small to large GRAVEL, few cobbles and boulders, little
i	o <u>—</u>	XXI.	<b>Y</b> 2	6	SS	51					!	to some clay, moist to wet (SM/GM)
				7	SS	78						
7 F						•						
년 전 전	<u>ٺ</u> -			8	SS	36	<u>.</u>					
SURFACE	-			9	SS	43						
" 5 2	۰·-			10	SS	44	!					
ב ב	-			11	ss	42						
DISTANCE	Z			12	SS	27	   					·
5 2	- 	翔		13	ss	27				24.5	700.2	Firm brown fine to coarse SAND
	-			14 <sup>A</sup> B	ss	50				27.5	697.2	and small GRAVEL, saturated (SP)
	-			15	ss	47						Dense brown fine sandy SILT, occasional small gravel, saturated (ML)
3	o	<b>7</b>		16	ss	24	16.3	2.75		30.2	694.5	
	-			17	ss	42	19.5	2.5*			·	Tough to hard gray silty CLAY, trace to little sand and gravel moist (CL)
3	5—-	1111)		18	ss	32	20.3	2.25	*	-		(6" COBBLE - 32' - 32 1/2')
	_	11		19	ss	49	24.7	1.0*				
	_			20	· ss	18	16.8	2.5*		38.5	686.2	Hard gray very silty CLAY, some

PROJECT BLACKWELL FOREST PRESERVE: DU PAGE COUNTY, ILLINOIS CLIENT FOREST PRESERVE DISTRICT OF DU PAGE CO., P. O. BOX 2339, GLEN ELLYN, IL. BORING G-132 Cont. DATE STARTED 4-3-85 DATE COMPLETED 4-9-85\*\* JOB 21,288 WATER TABLE ELEVATIONS 724.7 GROUND SURFACE \_\_\_\_ AT END OF BORING \_\_ 631.7 END OF BORING\_ 24 HOURS\_ LOCATION: 1187.9 N WHILE DRILLING: -23.0 Feet \*\* Date of well completion SHEET 2 of 3 SAMPLE WC Q BORY DEPTH ELEV. SOIL DESCRIPTIONS NO. TYPE 21 SS 39 LO.6 4.5+ Hard gray very silty CLAY, some sand and gravel, moist (CL/ML) 22 SS 10.4 59 4.5+ (COBBLE - 46' - 46 1/2')23 SS 41 12.9 14.25 46.5 678.2 SS 46 11.3 13.0\* Hard gray silty CLAY, trace sand and gravel, moist (CL) 25 SS 49 14.9 3.5\* 26 A 50.8 673.9 SS 86/1125.2 3.75 Very dense gray SILT, little to 52.3 672.4 some fine sand, saturated (ML) 27 SS 40 19.6 3.0\* 51 12.7 28 3.25 Distance Below Surface in Feet Very tough to hard gray silty 29 SS 12.2 12.25 CLAY, trace sand and gravel, moist (CL) 30 SS 32 13.0 2.75 (Thin sand layer - 53 1/2' to 53 3/4') 31 SS 30 **13.2** 2.75 SS 38 64.5 660.2 2.25 10.7 33<sup>A</sup> B SS 66 Dense brown gray fine sandy SILT, little gravel, moist SS \$6/10 (3" sand and gravel layer SS \$5/5 between 63 3/4' to 66') 70-36 SS 100/4 70.8 753.9 75 -BEDROCK: Gray DOLOMITE

		PR	OJE	ст _ <sup>1</sup>	BLACK	WELL	FORES	T PRI	SERVE	บน	PAGE	COUNTY, ILLINOIS	
		CLI	ENT	·	ORES	r Pre	SERVE	DIST	RICT (	of DU	PAGE	CO., P. O. BOX 2339, GLEN ELLYN, II.	
		80	RIN	<u>G</u> -	-132 (	Cont.	DAT	E STA	ATED _	4-3-8	5	DATE COMPLETED 4-9-85** JOB 21,288	<u>}</u>
												WATER TABLE	
		GRO	אטפ	0 51	RFACE	·	7	24.7				AT END OF BORING	
		ENC	0	F 80	RING _		6	31.7				24 HOURS	
•			È			LOCAT	ION:	1187 544	7.9 N			WHILE DRILLING	
			5 3	**	Date	of w	<u>ell c</u> T	omo Le T	tion	<del>                                     </del>		SHEET 3 OF 3	
,	8 O —				TYPE		MC	0,	BORY	DEPTH	ELEV.	SOIL DESCRIPTIONS	
J	85—				•				·			BEDROCK: Gray DOLOMITE	
DISTANCE BELOW SURFACE	95				DRIII Original usin hole of 8 rise was hole pipe grou 3 34 flus into	LING inal 8 3 was 3'. r pi pump . was t to 4" b hed pla	pilo  yilo  yilo  dril  Both  e wa  d th  ne en  fill  set,  ith  e ov  Bott  Bott	ONIT hole hole hole sins rough cire the of the of clean of of	e was nd Rev rom O' s were talled drill annula th gro holes pen ho	WELL  drill ert t to t ream in e rod r spa ut. Were le (i . A l. well hole:	ed an o a d he NW ed wi ach h lower ce pl After advan n roc steel : 73' : 83'	,	
												-Approximate unconfined compress strength based on measurements a calibrated pocket penetrometer	# 1 <sup>1</sup>

	·	280 15	cT.	BLACK	WELL	FORES	ST PRE	ESERVE	: DU	PAGE	COUNTY, ILLINOIS
		· · · · · ·									CO., P. O. BOX 2339, GLEN ELLYN, IT
							DATE COMPLETED _4-16-85** JOB _21,23				
		B0	*	* Dat	e_of	well ATION	WATER TABLE				
											AT END OF BORING
		GROUNG				6	33.0				
		END OF	. BC	RING _ L	OCAT	ON:				•	WHILE DRILLING -12.5 Feet
		EA				2	089.7	W			SHEET 1 OF 3
	_	444 844		TYPE	N	wc	Qu	YDRY	ОЕРТН	ELEV.	SOIL DESCRIPTIONS
	0-		1	ss	19	30.7	2.5*				FILL: Brown to dark brown silt CLAY, little sand and
			2 <sup>A</sup> B	ss	28	14.7			2.5	703.5	
	5_		3	ss	42				•		
			4	ss	30						Firm to very dense brown fine
			5	ss	43						to coarse SAND and small to medium GRAVEL mixed with a little brown clay between 2.5'
	10-		6	ss	58			·			3.5', moist to saturated at 12.5'
EET K			7	ss	57		•				(SP)
N N	15		8	SS	35				16.2	689.8	
OW SURFACE IN FEET	•		9	SS	35				10.2	007.0	
	20_		10	SS	26					. •	Firm to very dense brown and
E BEL			11	SS	25						gray fine to coarse SAND and small gravel, saturated
DISTANCE			12	ss ss	2 <i>i</i> 50/5						· (S?)
ō	25_		ני	33	5073			{			
			14	SS	37				26.0	680.2	Dense to very dense gray medi:
			15	ss	52						to coarse SAND and small to large GRAVEL, occasional cobb- little to some silt and clay
	30-		16	ss	46				30.2	675.8	Dense brownish grav firm SAND
	•		L7 <mark>A</mark> B	SS	47				33.2	672.8	little silt, saturated (SM)
	35_		L8	<b>SS</b> .	48				36.0	670.0	Dense to very dense gray silt SAND, little gravel, saturated (SM)
			L9	ss	71 .				10.00	570.0	Very dense gray sandy SILT, little gravel, trace clay, mo
4	ın-		20	SS	50/6						(HL)

	Р	ROJE	ECT	BLACK	WELL	FORES	T PRE	SERVE	: מס	PAGE	COUNTY, ILLINOIS
•											CO., P. O. BOX 2339, GLEN ELLYN, IL.
	В	ORIN	iG		-133 of	DAT well c	E STAN	RTED_ tion	4-9-	-85	
	_					VATIONS			•		WATER TABLE AT END OF BORING
				ORING.			633.0		<del></del>		24 HOURS
	ξ.	2 2 2	ייייייייייייייייייייייייייייייייייייי			ION:		S			WHILE DRILLING: -12.5 Feet SHEET 2 of 3
40-		L ENG		MPLE TYPE	N	WC	Q,	<b>V</b> DRY	0EPTH		
40			21 <sub>B</sub>	1	100 50/	/1.0" 5"			40.8	665.2	Very dense gray sandy SILT, little gravel, trace clay, moist (ML)
45-											
50-											
											BEDROCK: Gray DOLOMITE
Surface in Feet								•	·		
. 00	1							·		_	
woled entering 62 -											·
											- ·
70 <b>-</b>	1										
75 -				End	of B	bring	at	-73.0	Feet		
<b>9</b> 0 -											*-Approximate unconfined compression strength based on measurements wit a calibrated pocket penetrometer.

											COUNTY, ILLINOIS	
		LIEN	л _	FORES'	r Pre	SERVE	DIS	TRICT	OF DU	PAGE	CO., P. O. BOX 2339, GLEN ELLYN, I	L.
			MG	G-13	3	DAT	F 27/	ATED	4-9-8		DATE COMPLETED 4-16-85** JOB 21.	
								letion	•		WATER TABLE	
				WRFACE							AT END OF BORING	
	1	NO	of B	ORING _	OCAT	TON	633.0	) .5 S			WHILE DRILLING	
		*	Ē		COCAL			.7 W			SHEET 3 OF 3	
				MPLE TYPE	N	wc	Q,	<b>BORY</b>	DEPTH	ELEY.	SOIL DESCRIPTIONS	
80-	J		П									
	4			מת	LLTN	AND	MON	TORING	WEIJ.	INST	ALLATION NOTES:	
	$\dashv$										·	
	$\dashv$			1 -							terial .	
85-											ith 8" rotary bit using Revert. en was installed at 21.0'.	
					Grav	el pa	cked	from	21.0	to -	9.0 feet. The annular space	
	$\dashv$				was	seale	d wid	h beni	onite	pell	ets from -9.0 feet to -3.0 feet.	
	$\dashv$					casi		tor ca	sing	was c	oncreted into place over the PVC	
90-					- 1	•	. •			_		
				-				led in				
<b>-</b>	$\exists$										d drilled by rotary method using nd hole was drilled by the same	
2	4										d with an 8" bit to the desired	
- ≝ 95-											nstalled in each hole. Cement	
<b>.</b>	$\dashv$										through the drill rod lowered  The entire annular space	
SUMPACE	$\dashv$										of the PVC pipe was filled with	
Ď n	$\dashv$				grou	. A	fter	allowa	nce d	f sev	eral days for the grout to set,	
5	$\dashv$										into rock with a 3 3/4" core  k) and the casing for each	
] 	-			.							ater. A steel protector casing	
											each well.	
DISTANCE OP				G	133D							J
	4			1 7	1).	- 1		8" ho	le an	d PVC	Casing: 43'	
05-	$\dashv$			i i	2).			1			le: 53'	
				1 1	1330							
	-			1 7	1).			8" hc	le an	d PVC	casing: 53'	
	$\exists$				2).		i .	uncas			1	
110 -					-,,							
	$\Box$											
	4				İ					'		
	$\dashv$							1				
115-	-											
	$\dashv$											
					1							
		1 1	l í	, 1	, i					t	1	

		_ RI ACKL	जना ह	OPEST	. bbtc	FRVF.	ו זות	PAGE C	COUNTY, ILLINOIS
									O., P. O. BOX 2339, GLEN ELLYN, IL.
	_	-							DATE COMPLETED 4-17-85 JOB 21,288
	20			ATIONS		•			WATER TABLE
	GROUND	SURFAC	F	72	5.8				AT END OF BORING
	END OF	BORING		63	4.8				
	<b>*</b>		LOCAT	ION:	001.	3 N 1 E			WHILE DRILLING -24.96 Feet
	E THE	SAMPLE	Т	Ι			Γ	Γ	SHEET 1 of 3
	2 2 2	NO. TYPE	N	wc	Qu	40KA		<u> </u>	SOIL DESCRIPTIONS
		1   55	26				8:3	725:5	little sand
		2 ss	30						FILL: Dark brown silty CLAY, little sand and gravel,
•	5	3 SS	100						moist (CL)  FILL: Brown fine to coarse SAND
		4 SS	78				7 5	718.3	and small to large GRAVEL mixed with brown silty
		s ss	50/5"			•	7.3	10.3	clay, moist (SC)  FILL: Brown fine to coarse SAND
	10 30	6 SS.	50/4"			•			and small to medium GRAVE: little clay, moist (SC)
	- 055.00 V	7 <sup>A</sup> SS	53				12.8	713.0	
FEET		В .		14.3	4.5*		14.0	711.8	F3
Z		B   SS	45	11.6	i				moist (CL)
SURFACE		9 <sup>A</sup> SS	43	11.4	4.5+* -		17.5	709 3	Hard gray silty CLAY, trace sand and gravel, moist (CL)
URF		1			. }		17.8	708.0	Dense gray fine to coarse SAND
8 ≩	-2811			٠			19.5	706.3	and small to large GRAVEL, saturated (SW)
BELC	20-11	o ss	31	17.9	4.0*				BOULDER
		1   55	46	18.6	3.75				Hard gray silty CLAY, trace sand and gravel, moist (CL)
DISTANCE	$\exists \downarrow \downarrow \downarrow \downarrow \downarrow 1$	2 ss	29				24.8	701 0	
٥	251	3   \$\$	69				24.0	701.0	Very dense brownish-gray SILT, little sand, little clay,
	1	4 55	55	9.4			27.3	698.5	saturated (ML)
	30—230	s ss	.95	10.4	3.75		29.5	696.3	Very tough to hard gray very silty CLAY, little sand and gravel, moist (CL-ML)
	1	6 ss	45	•					Dense to very dense gray clavey SAND and GRAVEL, moist to
		7 SS	90						saturated (SC)
	351	8 SS	50	12.6			36.5	689.3	
•		g ss		17.3					Very tough to hard gray silty CLAY, trace sand and gravel, moist (CL)
	2 V	0 88	52	16.6	4.5*			L	

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PROJECT BLACKWELL FOREST PRESERVE: DU PAGE COUNTY, ILLINOIS CLIENT FOREST PRESERVE DISTRIAT OF DU PAGE CO., P. O. BOX 2339, GLEN ELLYN, IL. DATE COMPLETED 4-17-85 JOB 21,288 BORING \_\_\_\_\_ G-134 ELEVATIONS WATER TABLE 725.8 GROUND SURFACE \_\_\_\_ AT END OF BORING \_\_\_ 654.8 END OF BORING\_ 24 HOURS\_ LOCATION: 661.3 N WHILE DRILLING: -24.96 Feet 310.1 E SHEET 2 of 3 SAMPLE Q. VORY DEPTH ELEV. WC SOIL DESCRIPTIONS NO. TYPE SS 52 16.6 4.5\* Very tough to hard gray silty 19.5 3.25∜ CLAY, trace sand and gravel. 41.5 684.3 50 SS moist (CL) SS 50 Very dense gray fine to coarse SAND and GRAVEL, saturated 44.5 681.3 (SW-GW) 80 10.1 SS SS 83 | 9.8 Very tough to hard gray siltv CLAY, little sand and grave 89 11.7 4.5+\* SS moist (CL) SS 94 10.6 4.5\* SS 69 12.0 3.75 2.75 78 14.5 Distance Balow Surface in Feet 56.8 669.0 SS 53 21.3 Very dense brownish-gray SILT, little sand, saturated (ML) SS 78 60.8 665.0 Very dense brownish-gray fine t SS 73 medium SAND, little silt, 63.0 662.8 saturated (SM) SS 54 12.5 4.5\* Hard gray silty CLAY, trace sand and gravel, moist 65.0 660.8 50/4" 11.2 3.0\* Very dense gray clayey SILT, SS 50 little sand, moist to saturated (ML) SS 56 12.4 71.0 654.8 75 -BEDROCK: Gray DOLOMITE -Approximate unconfined compress strength based on measurements a calibrated pocket penetrometer

٠	•									COUNTY, ILLINOIS
										CO., P. O. BOX 2339, GLEN ELLYN, IL.
	BORIN	رو	G-1	34	DA1	TE ST	ARTED_	4-11-	85	DATE COMPLETED 4-17-85 JOS 21,288
	6.ROUN	4D S	URFACE		VATION		3	•		WATER TABLE AT END OF BORING
			RING_							24 HOURS
			L	OCAT	ION:	661.	.3 N			WHILE DRILLING -24.96 Feet
	<b>5</b>					310.	1 E			SHEET 3 OF 3 .
80	. 2		TYPE	N	wc	0,	KORY	DEPTH	ELEV.	SOIL DESCRIPTIONS
DISTANCE BELOW SURFACE IN FEET	<u>性相相相相相相相相相相</u>									BEDROCK: Gray DOLOMITE
	-11		End	of Bo	ring	at	-108.	5 Feet		
110	-					ŀ	DRING	WEILI.	NSTAT	LATION NOTES FOR G-134D:
	7 11									,
										pled by rotary method and reamed a depth of 73.5'. 4" PVC solid
	7 11									Cement grout with bentonite was
	$\dashv$ $\sqcap$		pumpe	ed th	rough	dri	ll rod	lowe	ed to	the bottom of the hole. The entire
115	- 11		annul	ar e	pace	plus	insid	e of	otto	of PVC was filled with grout. After
	- 11		allo	ring	seve	al d	ays fo	r the	grout	to set, the hole was extended using
	7 11		a J C	1/4"	DIE 4	na K	evert.	lhe	open	hole was flushed with clean water.  d and concreted over the well at
	7 11		the s				ا عرب	es TII	· CATTE	d The concreted over the Merr an
	7 11					case	i hole	: 73.	5' 2)	. Bottom of open hole: 103.5'

		PROJE	CT _	BLACK	WELL	FORES	PRES	ERVE	ַ טע	PAGE	COUNTY, ILLINOIS
		CLIENT	-	FORES	T PRE	SERVE	DIST	RICT (	OF DU	PAGE	CO., P. O. BOX 2339, GLEN ELLYN, IL
		RORIN	c	G-1	35	DATE	STAR	35	DATE COMPLETED 4-17-85** JOB 21,288		
		•••••	*	* Dat	e ot	well ations	сошьтя	etiou	-		WATER TABLE
		GROUN		105465			719.0				AT END OF BORING
							537.0				
		END C	F BO	HING _	LOCAT	: IONS:	878.	6 N		•	WHILE DRILLING -13.0 Feet
		z é	-				1552.	.3 W			SHEET 1 OF 3
		E NOT	,	MPLE TYPE	N	WC	Q,	FORY	ОЕРТН	ELEY.	- SOIL DESCRIPTIONS
	0	/XI				1			1.0	713.0	FILL - Dark brown silty CLAY,
	: 7	V	a	00		1		·		/ = 0.0	some sand & gravel (CL)
•		-W	1ъ	SS	29	1.			-		Firm grayish-brown fine to coarse
•		/ V	a		١.,	_					SAND and small to medium GRAVEL,
	<u>ج</u> :	ı <u>\</u>	2ъ	SS	16		- ,				moist to wet at 13.0' (SW/GW);
		N	a						-		sandy silt layers from 13.5' to
		☆ Δc	3ъ	SS	17				-:	-	14.5'; 3" seam of brown silty clay at 14.7'
		* - N	a		[ ! _	_			•		Clay at 14.7
	;		4Ъ	SS	17			_			
	10	الا فره	a			Ì			-		
	4		5ъ	SS	18				-	-	· .
	{	ė - X	а 6b	ss	17						•
	모 -		}					<b> </b>		•	-
			а 7b	SS	17	i i		}	' ، ' مام		
=	15-				-	15.3	3.00	•	13.0	704.0	Very tough to hard gray silty
ů.	<del> </del>		а 8ъ	SS	13		3.75				CLAY, trace sand and gravel,
ڃ	7		a			18.8	4.5+				moist (CL)
rface in	7		9ъ	SS	22	18.3	4.5+				
Seri	T		l a	SS	15	17.7 13.4	2.75	t	20.0	699.0	
	20		100	33	13	3.7	2.23		20.0	7,,.0	Layers of very tough brownish-gravery silty CLAY (CL); very tough
8	$\Box$ :	V	a			11.7	-	-		<u> </u>	hard gray silty CLAY (CL) and fir
	正		116	SS	24	15.6	4.5+	.	23.0	٠٥	brownish-oray clayey SILT (M
Distance Below	_]:	Y	a			18.8	4.5+	.			trace sand and gravel, moist
ä	25	///_	125	SS	29	18.2	4.5+				Hard to very tough gray silty
			1 3 H	ss	30	19.1 17.8	4.5+	<b>-</b>		1	CLAY, trace sand and gravel,
			[ ]			19.1	3.00	•			moist (CL)
	_{-		14H	ss	77	13.8	3.00	Ī	28.0	691.0	Layers of very dense gray clayey
						10.2					SILT (ML) and hard gray very silt
	30	J'IX	15H	ss	63	13.3	4.5+	<b>k</b>			CLAY (CL); trace sand and gravel moist; 4" seam of sandy silt @ 28
ì						:				<b>[</b>	
			16	ss 1	00/1	10.9					l
	7			1	JU, 1	10.9	-	}			
	Y	07.V	[,_]	ا ی					34.3	684.1	very dense gray line to coarse
	33	<i>2,</i> 7 ∖	17	SS	63	i			_	ļ	SAND and small GRAVEL, little
	7	%. <b>I</b> √	18	ss	58	į			•		silt, saturated (SP)
			- "	JJ	טע			ŀ	37.3	581.7	
			19	ss	92						gravel, occasional cobbles or boulders, trace clay, moist (PL)
	40	\\\ <u>\</u>					<u> </u>			10000	
	~~ .				٥.		1	ESTIN	16 SE	אוטצ	CORPORATION

DRILL RIG NO. 91

CLIENT   FOREST PRESERVE DISTRICT OF DU PAGE CO., P. O. BOX 2339, GLEN ELLYN, IL.		PROJE	ECT.	BLACE	KWELL	FORES	r Pre	SERVE	: מע	PAGE	COUNTY, ILLINOIS		
## Date of well completion # WATER TABLE  GROUND SURFACE 719.0 AT END OF BORING													
### SAMPLE NO.   TYPE   N   WC   Q   DRY   DEPTH   ELEV.   SOIL DESCRIPTIONS    ### Some gravel, occasional cobbles or boulders, some sand, moist (NL)  ### STANDARD   No.   TYPE   N   WC   Q   DRY   DEPTH   ELEV.   Solutions   SAMPLE   No.   TYPE   N   WC   Q   DRY   DEPTH   ELEV.   Solutions   STANDARD   S		BORIN	IG	G-1:	35	DAT	E STAF	RTED_	4-11-	85	DATE COMPLETED 4-17-85** 108 21,288		
END OF BORING 637.0  LOCATIONS: 878.6 N WILL DRILLING: -13.0 Feet SHEET 2 of 3  SAMPLE NO. TYPE N WC Q, FORY DEPTH ELEV. SOIL DESCRIPTIONS  Very dense gray sandy SILT, some gravel, occasional cobbles or boulders, some sand, moist (ML)  22 SS 78/110.0  23 SS 100/ 11.3  10"  47.8 671.7  80ULDER  Very dense brownish-gray very fine sandy SILT, saturated (ML)  Very dense brownish-gray very fine sandy SILT, saturated (ML)		·						tion		WATER TABLE			
LOCATIONS: 878.6 N   WHILE DRILLING: -13.0 Feet   SHEET 2 of 3		GROUI	ND SU	IRFAC	ε	7	19.0			AT END OF BORING			
SAMPLE   N   WC   Q,   VDRY   DEPTH   ELEV.   SOIL DESCRIPTIONS		END C	of BC	RING	· ·	637.0 CATIONS: 878.6 N							
SOIL DESCRIPTIONS  Very dense gray sandy SILT, some gravel, occasional cobbles or boulders, some sand, moist (ML)  21 SS 44 9.6  22 SS 78/1110.0  23 SS 100/ 11.3  10"  24 SS 50/5"  50 Very dense brownish-gray very fine sandy SILT, saturated (ML)		> 2			LUCAI	1002:							
Very dense gray sandy SILT, some gravel, occasional cobbles or boulders, some sand, moist (ML)  21 SS 44 9.6  22 SS 78/1110.0  23 SS 100/ 11.3  10"  24 SS 50/5"  50 Very dense gray sandy SILT, some gravel, occasional cobbles or boulders, some sand, moist (ML)  47.8 671.7  48.5 670.5  Very dense brownish-gray very fine sandy SILT, saturated (ML)		HGT	- 1		1 N	wc	0	YDRY	DEPTH	FLEV.			
Some gravel, occasional cobbles or boulders, some sand, moist (ML)  21 SS 78/1110.0  22 SS 78/1110.0  23 SS 100/ 11.3  10"  24 SS 50/5'  50——————————————————————————————————	4(	17.68.7						-					
21 SS 44 9.6  45 22 SS 78/1110.0  23 SS 100/ 11.3 10" 47.8 671.7 48.5 670.5  Very dense brownish-gray very fine sandy SILT, saturated (ML)  55 27 SS 100/ 11" 55 57 SS 100/ 11" 55 SS 1			20	SS	57	8.6							
23 SS 100/ 11.3 47.8 671.7 BOULDER  24 SS 50/5'  25 SS 100/ 11"  27 SS 100/ 11"  55 27 SS 100/ 11"  55 27 SS 100/ 11"  55 27 SS 100/ 11"  57 27 SS 100/ 11"	•		21	ss	44	9.6			. ;		or boulders, some sand, moist		
10" 24 SS 50/5' 50—25 SS 100/ 11" 25 SS 100/ 11" 26 SS 65/6' 27 SS 100/ 27 SS 100/	45		22	SS	78/1:	10.0							
50————————————————————————————————————			23	ss		11.3					:		
50————————————————————————————————————		1001			10"						BOULDER		
Very dense brownish-gray very fine sandy SILT, saturated (ML)	5(		24	ss	50/5	,			48.5	6/0.3			
26 SS 65/6' (ML) 55—27 SS 100/			25	SS									
55— 27 SS 100/			26	SS	1 - 1								
		一排和	].			•							
Lifter			27	SS	100/ 5 1/2				56 N	663.0			
Very dense gray sandy SILT, some gravel, moist (ML)	Surface in Feet	0.6	28	i	1 1					0.00			
29 SS 100/3"   59.5 659.5	loc.			cc	200/1	,,							
59.5 659.5 S9.5 S9.5	3 60		29	22	100/3				59.5	659.5			
	y ol	1891											
BOULDER .	<b>8</b>	1221		!	<b>!</b> [						BOIT DER		
	lon.										DOGBER		
ā 65————————————————————————————————————	ā 65	127			]								
66.5 652.5		-1921							66 5	652 5			
Very dense gray sandy SILT,									00.5	[	Very dense gray sandy SILT,		
some gravel, moist (ML)											-		
70 69.5 649.5	70	1111						;	69.5	649.5			
											•		
		[]								ļ ·			
		当川											
75 BEDROCK: Gray DOLOMITE	75	-##11									BEDROCK: Gray DOLOMITE		
	\				}				•				
\ - \	/								•				

•	Pf	LOS	EC1	- I	BLACK	WELL	FORES	T PRE	ESERVE	: DU	PAGE	COUNTY, ILLINOIS
												CO., P. O. BOX 2339, GLEN ELLYN, IL.
	80	RIF	(G		G-1	L35	_ DAT	E STA	ARTED _	4-11-	85	DATE COMPLETED 4-17-85** JOS 21.288
				大大	Date	e of t	vell ATION	compl <b>S</b>	ecion	•		WATER TABLE
	GR	اں	ND.									AT END OF BORING
	EN	D (	)F	80	RING _	_	. (	637.0				24 HOURS
		•	<b>-</b>	_	I	OCAT	CONS:	878	.6 N			WHILE DRILLING -13.0 Feet
		E	k } }				· · ·	1552	.3 W .	Υ	<del></del>	SHEET 3 OF 3
80	<del></del>	=			TYPE	N	₩C	Qu	KORY	DEPTH	ELEV.	SOIL DESCRIPTIONS
_	1											BEDROCK: Gray DOLOMITE
, -					End	of Bo	ring	at	-82.0	Feet		
-	1				•						ļ	
85	]				DRIL	LING	AND N	ONIT	PRING	WELL 1	NSTAI	LATION NOTES:
_		П		ı	One	Well	Inst	alle	i in B	edrock	- G-	135:
		П										119, the boring log for G-119
				- [	was	util	ized	for	he fi	rst 31	.0 fe	et of this boring log. Sampling
90-	}				at	this	locat	ion	resume	i at a	dept	h of 32 feet. The boring was
_				ľ	mad hol	e vas	ng a rean	3 3/ ed u	ing a	ary b:	otary	"Revert" drilling mud. The pilot bit and "Revert" to a depth of
	1			1	72.	D fee	c. 4	" PV	rise	r pip	was	installed in the bore hole.
	]			١	Cen	ent g	rout	with	bento	nite t	ras pu	mped through the drill rod which
E 95				$\cdot$								ore hole. The entire annular on of the PVC was filled with
_					gra	ut.	Aftei	all	wing	the g	out t	o set for several days, the
SURFACE 		$\  \ $		-								with a d 3/4" rotary bit and
				-								he open hole (in rock) and the clean water. A steel protector
į . —				-								er the well.
£100	}	11		-								
<b>-</b>				- [								
OISTANCE CO CO CO CO CO CO CO CO CO CO CO CO CO				1		{						·
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5105-				-							,	·
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110 -				ļ		ļ						
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115-					}							
, , , ,		$ \cdot $		-	Ī		:					
								.				
				-								-Approximate unconfined compression
											ŀ	strength based on measurements w

		PROJE	CT_	BL	YCXXEL	L FORE	ST PRE	SERVE						
		CLIENT	Γ	FC	REST P	RESER	VE DIST	RICT OF	DU PAC	E COUN	TY, CLEN ELLYN, ILLINOIS			
			G	G-137						DATE COMPLETED 8-7-86 JOB 23,1				
		W: 10			ELEVA	ATION:	\$				WATER TABLE			
		GROUN	ID S	URFACE						AT END OF BORING				
		END C	)F B	ORING _			645.2							
			<u>.</u>								24 HOURS - 9.5 Feet WHILE DRILLING - 9.5 Feet SHEET 1 OF 2			
		ENOT		MPLE	N	wc	Q <sub>u</sub>	YORY	DEPTH	· · · · · ·	<u> </u>			
	0-	region 1	$\top$	TYPE					0.3	699.4	Black clayey TOPSOIL, moist (OL)			
		13.0	1	SS SS		12.4 13.1					Dark brown very sandy gravelly CLAY little organics, moist, disturbed			
	•		2	ss	18	17.3	4.5*				(CL)			
	5		3	ss	15	15.5 20.3			4.5	695.2	Very tough dark brown silty CLAY,			
	-			3		20.3	3.5*		6.0					
		]elW	4	SS	46									
•	又 -		5	SS	24						Firm to dense brown fine to coarse SAND and small to large CRAVEL,			
	10—		5,	SS	34			٠			little silt, wet at 9.5' (SW)			
ET	•	山区	7	SS	36									
SURFACE IN FEET	又 15—	$\exists l. X$	.8	SS	49				·					
FACE			9	SS	21									
SUR	•	160	10	}	34						,			
ELOW	20 <del></del>								20.0	673.7				
E BEL	•	$\exists : \mathbb{X}$	11	`\$\$	55				Ì	·	Dense to very dense gray GRAVEL			
DISTANCE	•	-	12	55	95						and SAND, wet (CM)			
<u>0</u>	25_	$\exists . X$	13	SS	61									
	•		14	ss	62									
			15	ss	34						:			
	30-		16	55	33									
	,		17	A SS	11	20.1	2.0*		33.5	666.	Very tough gray silty CLAY, littl			
	35-	9.55 X	18	ss	78				33.5	666. 665.	yery dense gray GRAVEL and SANO,  (CW)			
		一道	19	A SS	32	13.6	4.5+	1	36.5	663.	Hard gray silty CLAY, little to s			
			20	1	155/9	ì			38.0	661.	Very dense gray clayey SANO and			
			1						1 44 5	I FAD	/ Mar. 1007142, 1755 (00/36)			

		PRO	JE	:T_		BLACKWELL FOREST PRESERVE									
		CLIE	NT		FOREST PRESERVE DISTRICT OF DU PACE COU							NTY, CLEN ELLYN, ILLINOIS			
				23.6			•	STAF	TED _	8-7-8	6	DATE COMPLETED 8-7-86 JOS 23,108			
		<b>W</b> :	101	10.2			ATIONS	99 7				WATER TABLE			
		END OF BORI										AT END OF BORING -14.5 Feet			
	1	END OF BOR						73.2				WHILE DRILLING - 9.5 Feet			
		;	YER.			<del>,</del>		<del>,</del>			<del>,</del>	SHEET 2 OF 2			
40-					TYPE	N	wc	Q,	<b>BORY</b>	DEPTH	ELEV.	SOIL DESCRIPTIONS			
			X	21	SS	95	·					Very dense yellow-gray fine to coarse SANO and small to large CRAVEL, trace silt and clay, wet (CM)			
				22		55						Site and cray, wee (on)			
45-		₹ } }	XΠ	23	SS	68/10	:			45.5	654.2				
50-				24	CORE		:					BEDROCK: Light gray to brown DOLGHITE micritic, occasional silt partings, trace stylolite moderate to high porosity fractured from 47.5'- 48.3 vertical fracture starting at 53.0'			
											·.				
2047ACE 14					End (	f Bar	ng at	-54.5	Feet			* Approximate unconfined compression strength based on measurements with a calibrated pocket penetrometer.			
1 1 1 1 1 1 1					HONIT	ORING	VELL INS	TALLA'	ION N	TES	. • •				
ц S	-		1		1).	1	redule 4		1		à≢n:	43.5 - 53.51			
DISTANCE	ᅥ				2).		nedule 4	1	1		[	+2.0 - 43.5'			
2	$\dashv$				3).	1	#490 :	, ·	1			42.5 - 54.5°			
65	_				4).	3	nite Pel	1	i i			40.0 - 42.51			
					5). 6).	1	y Grout otector well	ı	conc	eted i	h place	2.5 - 42.5'			
70															
	1														
	=														
75												·			
	$\exists$														

PROJECT					BL	ACXXE	LL FORS	ST PRE	SERVE		· .	
		CLIE	ENT		FO	REST I	PRESERV	E DIS	RICT OF	DU PA	E COUN	TY, GLEN ELLYN, ILLINOIS
												DATE COMPLETED 8-14-86 JOB 23,108
		<b>S</b> :		4.5		ELEV	ATIONS					WATER TABLE
		W: GRO	2249 UND	9.2   SUI			7					AT END OF BORING
		ENC	OF	BOR	IING _			50.1				24 HOURS
			>									WHILE DRILLING -16.0 Feet
			YEN T									SHEET 1 OF 2
0			NECO	NO.	PLE TYPE	N	wc	Qu	YORY	DEPTH	ELEV.	
Ū	_		$\bigvee$	1	SS	13	19.7				704.6	Dark brown silty TOPSOIL, little sand, some roots, damp (QL)
		P/	X	2	ss	17	21.6			Ì	704.8	Firm brown silty SAND and GRAVEL, mois
5			X	3 <sup>A</sup> 8	SS	9					, 03.3	Loose to firm brown fine to medium SAND, little clay binder, damp (SP)
	_	٠,٠	Ÿ	4	SS	18					•	
	·									8.0	698.6	
10		0,0	<u>N</u>	5	SS .	35						Dense brown fine to medium grained
			X	.6	SS	47				1		SAND with GRAVEL, damp; 0.2' brown sand clay seam at 10.3', damp (SP)
		0.0	X	7	ss	35	}					
. !! 		0,3	X	8	ss	37						
נו נו		A I	V	9	ss	34				16.0	690.6	
200			$\langle \cdot \rangle$			-						Firm to very dense brown silty SAND
5 20	 (		X	10	SS	24					•	and GRAVEL, wet (GW/SW)
	_	0	X	11	SS	15						·
DISTANCE	_		X	12	SS	13						
<u>,</u> 2	5		$\bigvee$	13	ss	17						
	_		X	14	ss	18						
	_		$\bigvee$	15 <mark>8</mark>	ss	63				29.5	677.1	
30	- -	7,0	X	16	\$S	23				122.0		Firm gray sandy CRAVEL, wet (CW)
	_	M	N	17	ss	63	8.8			32.0	674.6	Dense gray clayey SILT, some sand,
3	_ 5	#	M	18	SS	33	8.8					trace gravel, damp to moist, very moist from 44.0 - 46.0' (ML)
	_	1	M	19	SS	37	9.1					
	-	1		20	<b>\$</b> S	41	10.2					

	•			•••						•			
	PROJE	ECT _		BLACKWI	ELL FORS	EST PRE	SERVE						
	CLIENT	r	ſ	FOREST PRESRVE DISTRICT OF DU PACE COUNTY, GLEN ELLYN, ILLINOIS									
										DATE COMPLETED 8-14-86 JOS 23,108			
	S: 2	7 42t								WATER TABLE			
	. Y: Z	249.Z	DELCE		70	6.6				AT END OF BORING			
	5			•——	63	50.1							
	END O	if BU	KING _						•	24 HOURS			
										SHEET 2 OF 2			
	FREE		TYPE	N	wc	٥.,	8 DRY	DEPTH	ELEY.	SOIL DESCRIPTIONS			
40	THE	21		33	10.1								
	THY					ŀ				Dense gray clayey SILT, some sand, trace gravel, damp to moist, very			
		22	SS	48	12.0					moist from 44.0 - 46.0' (ML)			
<b>A</b> (		23	SS	16	11.5								
7.	_XX	43	33	' ' '				46.0	660.6				
										BEDROCK: Fractured to 48.0' light gra			
										to light brown DOLOHITE,			
		1		·	}					micritic, massive, occasion silt partings, high port			
50	<b></b>	24	CORE				•			occasional fractures, trace illite at 56.5'			
		1 27	WAZ							Tittle at 30.5			
FEET								·					
				]	1								
<b>Z</b> 55		}	•	•	<u> </u>								
SURFACE	] <del></del>	-			<del> </del>	-	<del> </del>		<b></b>				
			End d	f Bar	ing at	-56.5	Feet						
		İ							Ì	* Approximate unconfined compression strength based on measurements with			
ੈ ਜ਼ਵਾ					İ					a calibrated pocket penetrometer.			
8 8	′ -			İ					l ·				
ių			HONIT	ORING	WELL IN	STALL!	TION	OTES					
DISTANCE		1	1).	4	hedule	1		screen		44.0 - 54.0'			
-81 -			2).	1	hedule	The second second	1	ł .		+2.0 - 44.01			
<b>-</b> 6	\$	1	3).	ſ	# #490	1	1	}	}	43.5 - 56.5'			
			4).	i	nite P	į.	1	ļ		41.0 - 43.5'			
			5). 6).	l .	ay Gro	1				2.5 - 41.0'			
		-	*/:	in p	ace av	e nel	1	di eceo	ł				
	7 11	1											
70	,—				Ì	1		1					
	7 11	İ					}			·			
			İ	1	}			Į.	1				
						1							
7	5—	1											
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	1 1 1	1	1	í	1	1	1	I	4	1			

		PF	OJE	CT		B	LACXX	LL FUR	PRESRVE DISTRICT OF DU PAGE COUNTY, CLEN ELLYN, ILLINOIS								
		CL	IENI	r _		F	OREST	PRESRY	E DIST	RICT OF	DU PAC	E COUN	TY, CLEN ELLYN, ILLINOIS				
													DATE COMPLETED 8-19-86 JOB 23,1				
		н	: 5	40.	.3			.; ATIONS					WATER TABLE				
			25						700.1				AT END OF BORING -14.0 Feet				
							e42 e										
		EN	ם כ	F	BOR	iing _	<u></u>						24 HOURS				
			2	=									WHILE DRILLING - 7.5 Feet				
`			E	≥			<del></del> ,						SHEET 1 OF 2				
	•		LENG			PLE TYPE	N	WC	Q <sub>u</sub>	YORY	DEPTH	ELEY.	SOIL DESCRIPTIONS				
	0-	-/2	$\mathbb{N}$		1Å	<b>s</b> s	25	14.9			1.4	698.7	Black clayey TCPSOIL, moist (OL)				
			X		2	ss	Sä						. Firm to very dense light brown CRAVE				
	5_		Ň		3	ss	28						and SAND, little silt, damp (GW)				
	<b>V</b>		M		4Å	ss	48				7.5	692.6					
•	<b>.¥.</b>	افر ا	$\bigvee$	}							7.5	032.0					
	10-		$\langle \rangle$		5	SS	58	•	·				Firm to very dense gray SANO and GRAVEL, wet (GM/SW)				
	•			6	SS	48			i			NOTE: 3" Black sand seam at 9.3', strange odor					
FEET	모		X		7	SS	96			•							
Z	.15-		3	8	SS	21											
₹		7	·V		9Å	SS	30				17.0	683.1					
F			$\mathcal{M}$	7	B	23	30	17.8	+.5+*				Very tough to hard gray silty CLAY,				
ซ		7/	$\nabla$	Ø,	ام	<b>5</b> S	30	18.0	2.0*		}		little sand, silt partin gs, moist				
ELOW SURFACE !			ĴΜ	╡,	oğ	33	130				19.5	680.6	Firm brownish gray fine sandy SILT				
BEL	20-	1	1		ı				[		20.0	680.1	trace clay, moist (HL)				
•			:][]	1	1	SS	24		1		1		Firm gray fine to medium SAND, wet				
CE		10	ίλ								22.0	678.1					
DISTANCE		-11	MXI	ا ا	2	SS	66/10	10.4	H.S+*				Hard gray silty CLAY, little sand, gravel, moist (CL)				
IST		-16	<del>(X)</del>		Ì					}	24.0	676.1	3.000,000				
۵	25_		ИΧ	1	3	SS	74				1		Very dense (hard) gray very clayey				
	•	-17								l	ł		SILTS, very silty CLAY, some sand,				
		-117	ΗY	1	14	SS	58	14.9	+.5+*	ļ			occasional silt and sand seams, dar to moist, reddish hue to 25.0'				
		- M	WY.					}	1	]	28.0	672.1	(CL/ML)				
		-17.1	ŁΥ		15	SS	45	12.2	ļ	l	1		Dense brownish gray clayey SILT,				
	30-	171	$\mathcal{W}$	Ш							1		trace sand and gravel, moist (ML)				
	30		W	H,	16 <sup>A</sup> B	5S	37	17.3		Į	31.0	669.1					
			$ \Delta $		. В		1	12.1	+.5+*	1							
		1	łΧ	•	17	ss.	40	11.9	+.5+*				Tough to hard gray silty CLAY, lit sand, some gravel, moist (CL)				
		TV	(X)							1							
	35-	-11:	111	ľ	18	SS	29	12.8	3.0*	1							
		-M'	伙														
		-11/	<b>1</b> 1XI		19	SS	33	18.5 1.0*									
		-11	196			[											
		-4	41 X		20A	SS	59	16.5	2.25*	1	39.2	660.9	Very dense brownish gray sandy SIL				

.

#### KEY TO BORING LOGS

#### Sample Type

Unsampled interval

Auger cuttings sample

Drilled by hollow stem augers; not sampled; logged by cuttings

Hand sample from surface

4" outside diameter core barrel sampler

Drilled by rotary wash bore; not sampled; logged by cuttings

- 5' continuous sampler
- 3" outside diameter split spoon sampler
- 3" shelby tube
- 2" outside diameter split spoon sampler

#### **Borehole Material Graphics**

Concrete around flush-mounted protective casing

Concrete surface seal around well casing

Bentonite slurry or cement-bentonite grout around well casing

Bentonite pellet \_\_\_\_ound well casing

Bentonite pellet seal around well screen

Sand backfill around well casing

Sand filter pack around well screen

Sand backfill or natural soil collapse in borehole

Concrete surface seal over borehole

Bentonite slurry or bentonite-cement grout backfill in borehole

Cuttings backfill in borehole

Bentonite seal in borehole

#### Lithologic Description

Unknown lithology

Lean clay

Silty clay or clayey silt

Sandy clay

Concrete

Construction debris-laden fill material

Gravel

Clayey gravel

Silty gravel

Sandy gravel

Limestone or dolomitic limestone

Silt

Gravelly silt

Silty sand

Peat

Sand

Gravelly sand

Sandy silt

Topsoil





General Notes

#### Descriptive Soil Classification

#### GRAIN SIZE TERMINOLOGY

Sail Fraction	Particle Size	U.S. Standard Sieve Size
Baulders	Larger than 12"	Larger than 12°
Cabbles	37 to 127	3" to 12"
Gravel: Coarsa	¾" to 3"	15 to 3"
fiae	4.75 mm to ¾ *	#4 to ¾*
Sand: Caarse	2.60 mar to 4.76 ma	#10 to #4
Medium	0.42 mm tå 2 00 mm	≢40 to ≢10
fins	0.074 mm to 0.42 mm	≢200 to ≢40
	0.005 mm to 0.074 mm	
	Smaller than 0.005 mm	

Plasticity characteristics differentiate between silt and clay.

#### GENERAL TERMINOLOGY

#### RELATIVE DENSITY

Physical Claracteristics	Term "N" Valua
Calar, maisture, grain shape, fineness, etc.	Very Lause 0-4
Majer Constituents .	Loose 4-10
Clay, silt, sand, gravel	Medium Dense 10-30
Structure	Gense
Laminated, varved, fibroux, stratified, cemented, fixxured, etc.	Very Densa Over 50
Geologic Origin	
Glacial, alluvial, eolian, residual, etc.	· •

#### RELATIVE PROPORTIONS OF COHESIONLESS SOILS

#### CONSISTENCY

• • • • • • • • • • • • • • • • • • • •		Term	qtons/sq. ft.
Proportional Term	Defining Range By . Parcentage of Weight		0.0 to 0.25
Trace	0%- 5%	Medium	0.50 to 1.0
Little	5%-12%	Stiff	1.0 to 2.0
Same	12%-35%	Very Stiff	2.0 ta 4.0
And	35%-50%	Hard	

#### ORGANIC CONTENT BY COMBUSTION METHOD

#### **PLASTICITY**

Sail Description	Lass on Ignician	Term	Plastic Index
Nan Organic	Less than 4%	None to Slight .	Q-4 .
Organic Silt/Clay	4125	Slight	5-7
Sedimentary Peat	12-50%	Medium	8-22
Fibrous and Woody Pea	it More than 50%	High to Vary His	gh Over 22

The penetration resistance, N, is the summation of the number of blows required to effect two successive 6" pentrations of the 2" split-barrel sampler. The sampler is driven with a 140 lb, weight falling 10" and is seated to a depth of 6" before commencing the standard penetration test.

#### Symbols

#### DRILLING AND SAMPLING

pnilgmc2 zuguning-C3-C3 RC-Rock Coring: Size AW, SW, NW, 27 W RCO-Rock Quality Casignator R3-Rack Bit FT-Fieb Tail OC-Orave Casing C-Casing: Size 2527, NW, 47, HW CW-Clear Water OM-Ocilling Mud HSA-Hollow Stem Auger FA-Flicat Auger HA-Hand Auger COA-Clean-Out Auger \$5-2" Diameter Split-Barrel Sample 257-2" Diameter Thin-Walled Tube Sample 357-3" Diameter Thin-Walled Tube Sample PT-3" Biameter Piston Tube Sample

AS-Auger Sample

VIS-Wash Sample

PTS-Peat Samule

PS-Pitcher Sample

NR-No Recovery

S-Sounding

PMT-Sarehale Pressuremeter Test

VS-Vane Shear Text

WPT-Water Pressure Test

#### LABORATORY TESTS

q.-Panetrometer Reading, tons/1q. ft. q.-Uncontined Strength, tons/19. ft. W-Maisture Cantent, S LL-Liquid Limit, % PL-Plastic Limit, S SL-Shrinkage Limit, % U-Lass on Ignition, % 0-Ory Unit Weight, " 12. ft. gH-Measure of Soil Alkalinity or 🛌 FS-Free Swell, S

#### WATER LEVEL **MEASUREMENT**

V-Water Level at time shown NW-No Water Encountered WO-While Orilling 8CR-Before Casing Removal ACR-After Casing Removal CW-Caved and Wet CM-Caved and Maist

Note: Water level measurements shown on the baring logs regresent conditions at the time indicated and may not reflect static levels, especially in cahesive soils.

#### Description of porms

No. = Sample number within the boring

Rec. = Amount of sample recovery

Moist = Visual estimate of the amount of moisture in the sample.

Type = Sampler type and sample interval

N Value = The penetration resistance, N, is the summation of the number of blows required to effect two successive 6" penetrations of the 2" split-spoon sampler. The sampler is driven with a 140 lb. weight falling 30" and is seated to a depth of 6" before commencing the standard penetration test.

Depth = Depth below ground surface

Visual

Classification = Lithology symbol of stratigraphy; Description of stratigraphy; Borehole material graphics

qu(qa) = Unconfined compressive strength of the sample

PID = Photoionization detector reading

•	•						
Description of Soil	Samples	Descriptive Terms	Relative Density				
General Terminolog	27	NM = Not measured ND = Not detected	<u>Term</u> Very Loose	"N" Value 0-4			
consistency (of col Color Grain Size (of none Major soil constitue Minor proportions	cohesive soils) ent	M = Moist F = Frozen D = Dry W = Wet - = Measurement not possible	Loose	4-10 10-30 30-50 Over 50			
Other characteristic Unified Soil Classif	≃s or features ication System (USCS)	Symbol	Consistency				
Grain Size Terminole	,	•	Term Very Soft Soft	<u>qatons/sq</u> 0.0 to 0.25 0.25 to 0.50			
Soil Fraction	Particle Size	U.S. Standard Sieve Size	Medium Stiff Van Stiff	0.50 to 1.0 1.0 to 2.0			
Boulders Cobbles Gravel: Coarse Fine Sand: Coarse	Larger than 12" '3" to 12" 3/4" to 3" 4.76 mm to 3/4" 2.00 mm to 4.76 mm	Larger than 12" 3" to 12" 3/4" to 3" #4 to 3/4" #10 to #4	Very Stiff Hard	2.0 to 4.0 Over 40			

#40 to #10

Smaller than 0.005 mm Smaller than #200

#200 to #40

Smaller than #200

Plasticity characteristics differentiate between silt and clay.

0.42 mm to 2.00 mm

0.074 mm to 0.42 mm

0.005 mm to 0.074 mm

Medium

Fine

Silt

Clay





# UNIFIED SOIL CLASSIFICATION SYSTEM

#### COARSEGRAINED SOILS

(More than half of material is larger than No. 200 seive size.)

# GRAVELS More than half of coarse fraction larger than No. 4 siege size

Clean Gravels (Little or no lines)

GW Well-graded gravels, gravel-sand mixtures, little or no lines

GP Poorly graded gravels, gravel-sand mixtures, little or no lines

Gravels with Fines (Appreciable amount of lines)

GM d Silty gravels, gravel-sand-silt mixtures

GC Clayey gravels, gravel-sand-clay mixtures



Clean Sands (Little or no lines)

SW Well-graded sands, gravelly sands, little or no lines

SP Poorly graded sands, gravelly sands, little or no lines

Sends with Fines (Appreciable amount of lines)

SM d Silty sands, sand-silt mixtures

SC Clayey sands, sand-clay mixtures

#### FINE-GRAINED SOILS

(More than half of material is smaller than No. 200 sieve.)



ML Inorganic silts and very line sands, rock flour, silty or clayey line sands or clayey silts with slight plasticity

CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silly clays, tean clays

OL Organic silts and organic silty ctays of low plasticity



MH Inorganic silts, micaceous or diatomaceous line sandy or silty soils, elastic silts

CH Inorganic clays of high plasticity, fat clays

OH Organic clays of medium to high plasticity.

HIGHLY ORGANIC SOILS

PT Peat and other nightly organic soils

#### LABORATURY CLASSIFICATION CRITERIA

GW  $C_0 = \frac{O_{**}}{O_{**}}$  greater than 4;  $C_0 = \frac{10 \, \mu^2}{O_{**} \times O_{**}}$  between 1 and 3

GP - Not meeting all gradation requirements for GW

GM Atterberg limits below "A" line or 2.1, less than 4

GC Atterperg limits above "A" use of dual symbols

GC line with P.I. greater than 7

SW  $C_{ij} = \frac{O_{ij}}{O_{ij}}$  greater than 6;  $C_{ij} = \frac{(O_{ij})^2}{O_{ij} \times O_{ij}}$  between 1 and 3

SP Not meeting all gradation requirements for SW

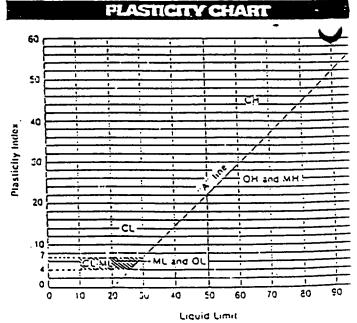
SM Atterberg limits below "A" line or P.I. less than 4

SC Atterberg limits above "A" line with P.I. greater than 7

Limits plotting in hatched zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.

Above "A" line with P.L.

Determine percentages of sand and gravel from grain-size curre. Depending on percentage of lines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:



For classification of line-grained soils and line traction of coarse grained soils.

Attending timits plotting in hatched area are borderline classifications requiring use of dual symbols.

Equation of Ailine: Pl = 0.73 (LL - 20)

W	A R	Z	Y	N
		4		

Project Blackwell Landfill
RI/FS
Location Warrenville, Illinois

Boring No. G-140D
Surface Elevation 702.9
Job No. 6072100
Sheet 1 of 2

Rotary 41-59'

_				<u>2100</u>	CCR	PORATE DRIVE - ADDISON, ILLINOIS 60101 -	<u>TEL. (</u> 7	(80	<u> 691-5000                                  </u>				
	SA	MP	LE		PRO	VISUAL CLASSIFICATIO			SOIL	PRO	PER	TIE	S
Number	Rec. P(ft.)	Mois- ture	N De	epth ft.)	L	and Remarks			qu (qa) (tsf)	019 (mqq)			
	TI		-			Black Silty TOPSOIL						İ	
			l F		田	Medium Stiff, Dark Brown to Black,				1 1		- 1	
	1.0	M			田	Mixed Silty Clay and Silty Fine Sand	,					{	
1	1.0	IAT	''F		##	Some Fine to Coarse Gravel (FILL)				1.5	1		
	<b></b>			_	{{	Medium Dense, Light Brown Fine to	1970			11.5			
2	1.2	M	12-	5-		Medium Sandy SILT, Some Fine to Coarse Gravel (ML) (TILL)				1.5			
			l F			Coarse Graver (ML) (TILL)				1 1	1		
3	1.2	М	11							6.0			
(	1.2	TAT	1 'F							0.0		Ì	
	╀		$\vdash$		<b>      </b>					<del>  </del>			
4	1.2	W	17-	10-		Medium Dense, Brown, Silty Fine to			_	2.5			
	ji .		l F			Medium SAND, Little Fine to Coarse				1	1	ļ	
	1.5	W			H	Gravel (SM) (TILL). Scattered 1" Br	own /			0.1		i	
5	1.5	1 14	I F			Fine to Coarse Sand Seams	/ }			0.1		1	
	<b>,</b>	<u> </u>	<del>  F</del>	45_		Loose, Gray Fine Sandy SILT (ML) Thin, Horizontal Laminae (1/4" to 1/	/2*\		<del></del>				ļ
6	1.5	W	2-	15-	11 11	of Silt, Fine Sand and Silty Fine Sand	d			0.2			
			<u>l</u> F			(ML/SP/SM) (Medial Outwash)			L	1	- 1		{ _
7	0.3	M	17			Medium Dense, Gray Fine to Medius	m	ցանցում արդականին արագարան արդանական արդանական արդանական արդանական արդանական արդանական արդանական արդանական արդ Արդանական արդանական արդանական արդանական արդանական արդանական արդանական արդանական արդանական արդանական արդանական		0.5			
	0.3	"	1 "E		-	SAND (SP)				0.5	- 1		
		<u> </u>		20-		Very Dense, Gray-Brown Fine to Co	arse			-			<u> </u>
8	1.5	M	41-			Gravelly SAND, Little Silt (SP-SM)	Į			0.5			
		<u> </u>	<u>l</u> E				ŧ			<u> </u>			
9	1.5	W	26							0.2			-
1	1	] "	1	i						0.2			
				25-									<u> </u>
10	1.3	W	21-	,			·			0.2			
<u></u>	<u> </u>	<u> </u>	<u> </u>									l	<u> </u>
11	0.5	W	15				l			0.6	<del>                                     </del>		+
1 **	V.5	"	1 12				ļ			0.0			
<u></u>				30-						_	<u> </u>	1	<del> </del>
12	0.7	W	26-							0.6	Ī		
			<u> </u>							<u> </u>		<u> </u>	1
13	0.8	W	19				ļ			0.6	1		+
		"	1 "=							0.0			
		L	WAT	EF	? L	EVEL OBSERVATIONS	[	(	SENERA	LNO	TE	<u> </u>	<u></u>
Wh	ile Dri	lling				on Completion of Drilling	Begin		10/91 End				
	ne Aft				<u> </u>		Driller	M	athes Chie	f JE	31	Rig C	ME
De	pth to	Water	• `_				11 00000	- 1	TED EX:	a- 74'	w	7	5
De	pth to	Cave	in				Drill M	leth	od 4.25" I	HSA 0-	41'	Wast	h

The stratification lines represent the approximate boundary between soil types; the actual transition may be gracual.

	LOG OF TEST BORING	Boring No. G-140D
WARZYN	Project Blackwell Landfill	Surface Elevation 702.9
	RI/FS	Job No. 6072100
	Location Warrenville, Illinois	Sheet 2 of 2
2100	CORPORATE DRIVE - ADDISON, ILLINOIS 60101 - TEL. (708)	•
SAMPLE	P   38	SOIL PROPERTIES
L	្ទី VISUAL CLASSIFICATION   ខ្ទី ខ្ទី	
Number   Rec. Hois- N Depth	$\lfloor lat{t}  vert$ and Remarks $\lfloor lat{b}  lat{t}  vert$	(da) bio
E(ft.) ture value (ft.)	E     E     E         E	(tsf) (ppm)
14 1.0 W 24-35-		
17   1.0     27		0.5
15 0.8 W 51-		0.2
16 0.7 W 25-		
40-	Dense, Gray-Brown Fine to Coarse Sandy SILT, Some Fine to Coarse Gravel (ML)	0.2
17 0.3 W 50	SILT, Some Fine to Coarse Gravel (ML)	0.5
	<del>\$</del>	
	氢	
	<b>4</b>	
	<del>2</del>	
1 11 1 E	<b>4</b>	
1		
1	<b>4</b>	
I I E sa	<del>2</del>	
1 1 1 E 3 E	<b>4</b>	
	Liebs Beaus to Liebs Con. Word	
	Light Brown to Light Gray, Hard  DOLOMITE; Small Pinhole-Sized Vugs	
	<b>/</b>	
	Fod of Position 1500 F	
	End of Boring at 59.0 Feet	
1 11 1 1 5		
65-		
- 70-		

W	A	R	Z	Y	N
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Time After Drilling

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

Depth to Water Depth to Cave in

#### LOG OF TEST BORING

Project Blackwell Landfill RI/FS Location Warrenville, Illinois

Boring No. G-141D Surface Elevation \_\_\_705.6 Job No. 6072100 Sheet I of 2

Logger GFP Editor JAW

Drill Method 4.25"HSA 0- 44.5' Wash

Rotary 44.5-66.5'

2100 CORPORATE DRIVE - ADDISON, ILLINOIS 60101 - TEL. (708) 691-5000 -SAMPLE SOIL PROPERTIES VISUAL CLASSIFICATION Rec. Mois-Depth PID and Remarks (qa) (ft.) ture (ft.) (pom) (tsf) Black Silty TOPSOIL Very Dense, Brown Silty Fine to Coarse SAND, Some Fine to Coarse Gravel 50/5 0.8 M (FILL) 1.8 Soft, Brown, Varigated Silty CLAY Little Fine to Coarse Sand (FILL) 13 0.7 M Medium Dense, Brown, Fine to Coarse 1.8 Gravelly SAND (FILL) 19 1.7 M Black, Old TOPSOIL 10.0 Medium Dense, Brown, Fine to Coarse SAND, Some Fine to Coarse Gravel, M 16 2.0 Little Silt (SP-SM) 8.0 Medium Dense, Brown Fine to Medium 1.7 M/W 12 SAND, Trace Silt (SP) Medium Dense, Brown, Silty Fine to 10.0 Medium SAND (SM), (Leachate Odor) Ŵ 10 Medium Dense, Brown Fine to Coarse 0.5 SAND, Some Fine to Coarse Gravel. W 35 1.7 Little Silt (SP-SM) (Leachate Odor) 0.8 Loose, Gray Fine Sandy SILT, Little W 71 2.0 Clay (ML) 0.0 Very Dense Gray Fine to Coarse Sandy 84 M GRAVEL, Some Silt Scattered Cobbles 0.5 and Boulders (GM) 1.3  $\overline{\mathbf{W}}$ 65 0.5 11 0.8 26 8.0 0.7 9 Medium Stiff, Gray Fine to Medium Sandy SILT, Little Fine to Coarse Gravel 0.0 (ML) QP=1.5 TSF (TILL) W 1.7 15 Medium Dense, Gray Fine to Coarse GENERAL NOTES WATER LEVEL OBSERVATIONS While Drilling \( \frac{14.0'}{2} \) Upon Completion of Drilling \( \frac{14.0'}{2} \) Begin 6/13/91 End 6/13/91 Drill
Driller Mathes Chief JB Rig CME

WARZYN
7
<b>—</b>

Project Blackwell Landfill Surfa
RI/FS Job 1
Location Warrenville, Illinois Sheet

Boring No. G-141D

Surface Elevation 705.6

Job No. 6072100

Sheet 2 25 2

1					L	ocation <u>Warrenville, Illinois</u>			Sheet2	of <u>2</u>	***********
				- 2100	COR	PORATE DRIVE - ADDISON, ILLINOIS 60101 TEL.	(708	) 6	591-5000 <del></del>		
	SAI		E		P R O	VISUAL CLASSIFICATION		SOIL PRO	PROPERTIES		
Number	Rec. M		N Value	Depth (ft.)	i E	and Remarks	Ocurco Canada		qu PID (qa) (tsf) (ppm)		
14	0.7	·W	-16	_ 35-		SAND, Little Fine to Coarse Gravel (SP)			0.0		
15	امنا	<u>_w_</u>	14	_		Medium Stiff, Gray Fine to Medium	TELL		0.0		
16	1.9	M	24	<u>_</u>		Sandy SILT, Little Fine to Coarse Gravel (ML) (TILL)	กษณฑฑสมาณการการการการการการการการการการการการการก	กรีกกรกรีกกรรมประจากกรรมประชาการ	0.5		
17	2.0	M	48	<u>-</u> -			National Property of the Party		0.4		
18	1.5	M	25	40- -  -			nanan	<u> </u>	0.1		
	<del>   </del>	<del></del>		_	۳	Dense, White, Silty Fine to Coarse	1		0.2		<del></del>
19	1.3	W	30	_		GRAVEL (GM) (Weathered Dolomite			0.0		
20	0.3	W	50/4	<del>-</del>		Bedrock)		탐	0.4		
				50-		Hard, Light Gray to Light Brown, Slightly Vuggy, Mostly Solid DOLOMITE, Vugs Range From Pinhole to 1/20" Diameter; No Discernable Fossils; RQD-5.2/5.6. Most Fractures are Horizontal; Vertical Fracture at 48.5' to 49.1'  End of Boring at 66.5 Feet					

W	Α	R	Z	Y	N
1			4		

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

#### LOG OF TEST BORING

Project Blackwell Landfill Remedial Investigation Location Warrenville, Illinois

Boring No. P3 Surface Elevation 704.2 Job No. 60721.00 Sheet <u>1</u> of <u>1</u>

				- 21	00	COR	PORATE DRIVE - ADDISON, ILLINOIS 60101 -	TEL.	708)	691-5	5000				_/
	SA	MPI	E		Ť	NICHAL CLASSIFICATION					SOIL I	PRO	PER	TIE	S
-	T Rec.	Hais-	N	Dept	in	F	and Remarks		O		qu	PID		$\neg$	
Number	E(ft.)	ture	Value			Ë			<b>E</b> E		(qa) tsf)	(ppm)			
				-			Black to Brown Organic SILT (OL)		หลงจับกรกกรปลากก เจากรับกรกรบกรกร					1	
				<u>-</u>			Dark Brown to Brown Silty Fine SAN								
				<b>-</b>	Ė		and Fine to Coarse GRAVEL, Dry and Loose (SP-GP)	na							
			ł				20030 (0. 0.)								
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<u> </u>				- -	s—				กระบรกบลกกระเกรากกรกก กระบรกกกรกกรกรกกร						
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1	11				Ė									ļ	
2	1.3	W	13	<b>享</b> 10	⊶[		Decreasing Silt with Depth, Trace	•							
-	1	"		_	-	( (	Dolomite Cobbles and Rust Color.								
<u></u>	<u> </u>														
		1		L		•									
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				F		•									
				- 1º	5-		End of Boring at 15 Feet								
1							Installed Piezometer P3 to 15 Fee	et							
	11		)	┝								Ì	1		
			'	F											
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			WA	TE	R	L	VEL OBSERVATIONS		(	<u>SEN</u>	IERA	LNC	)TE	S	
					- 1 -	Uρ	on Completion of Drilling $\frac{2}{2}$ 9.7	Begir	6/	4/9	1 End	6/4	/91	Drill	
	ne Aft oth to							Drille	r M	the	s Chief	JI	B W	Rig <u>C</u>	ME75
	oth to							Drill	Meth	od	4-1/4"	HSA			

W	Α	R	Z	Y	N
	J		4		

Project Blackwell Landfill
Remedial Investigation
Location Warrenville, Illinois

Boring No. P2
Surface Elevation 696.5
Job No. 60721.00
Sheet 1 of 1

SAMPLE    Number					- 210	00	COR	PORATE DRIVE - ADDISON, ILLINOIS 60101 -	TEL. (	708)	691-5000 -		<del> </del>	
Straight Drill 5 Feet, then sample every 5 (saf) (spn)		SA	MP	LE			PRO			8 C X	SOIL	PRO	PERT	TIES
Straight Drill 5 Feet, then sample every 5 foot interval. Black to Brown Organic Clayey SILT, Trace Fine Sand (OL)  Brown Fine to Coarse SAND and GRAYEL, Trace Silt and Dolomite Cobbles. (SP)  Drill to 12.5' for Well Placement  End of Boring at 12.5 Feet Install Piezometer P2 to 12.5 Feet  Install Piezometer P2 to 12.5 Feet  While Drilling Sa.0 Upon Completion of Drilling 5.0 Begin 6/3/91 End 6/3/91 Drill Driller Mathes Chief JTB Rig CME Logger TJM, Editor JAW Drill Method 4-1/4* HSA	Humber	Rec.	Mois- ture	N Value	Dept	h )	tJE	and Remarks		10 L	(qa)	1		
Sand. (ML)  Brown Fine to Coarse SAND and GRAVEL, Trace Silt and Dolomite Cobbles. (SP)  Drill to 12.5' for Well Placement  End of Boring at 12.5 Feet Install Piezometer P2 to 12.5 Feet   WATER LEVEL OBSERVATIONS  While Drilling ▼ 8.0 Upon Completion of Drilling ▼ 5.0 Begin 6/3/91 End 6/3/91 Drill Time After Drilling Depth to Water Depth to Cave in Drill Mathes, Chief JTB Rig CME Logger TJM Editor JAW Drill Method 4-1/4* HSA					· - · - · - · - · - · - · · - · · - ·			foot interval.  Black to Brown Organic Clayey SILT  Trace Fine Sand (OL)	Γ,	AMANA SERVICES				
GRAVEL, Trace Silt and Dolomite Cobbles. (SP)  Drill to 12.5' for Well Placement  End of Boring at 12.5 Feet Install Piezometer P2 to 12.5 Feet  UNATER LEVEL OBSERVATIONS  WATER LEVEL OBSERVATIONS  While Drilling Solution of Drilling 5.0 Time After Drilling Depth to Water Depth to Cave in Drill Method 4-1/4" HSA	1	1.1	M	14	- -	7 4 73		Sand. (ML)	•	0.000.00				)
Drill to 12.5' for Well Placement  End of Boring at 12.5 Feet Install Piezometer P2 to 12.5 Feet   —————————————————————————————————				Š.	Z	1	0.0.0.0	GRAVEL, Trace Silt and Dolomite			·			
Install Piezometer P2 to 12.5 Feet	2	1.2	W	20	- -									
While Drilling   8.0 Upon Completion of Drilling   5.0 Begin 6/3/91 End 6/3/91 Drill   Depth to Water  Depth to Cave in   Drill Method 4-1/4" HSA					- - - - - - - - - - - - - - - - - - -			Install Piezometer P2 to 12.5 Fee	et					
While Drilling   8.0 Upon Completion of Drilling   5.0 Begin 6/3/91 End 6/3/91 Drill  Depth to Water  Depth to Cave in   Drilling  Dril				WA	TE	R	LE	VEL OBSERVATIONS			ENERA	NO	TES	
	Tim Dep Dep	e Afte th to th to	er Dri Water Cave	lling in			_	•	Driller	6/: M:	3/91 End thes Chief JM Edito	6/3/ JTI r JAV	91 Dr 3 Ri	ill g CME7



2100 Corporate Drive Addison, IL 60101 TEL. (708) 691-5000

### LOG OF TEST BORING General Notes

#### EMPIRICAL CORRELATIONS WITH STANDARD PENETRATION RESISTANCE N VALUES \*

	N VALUE * (BLOWS/FT)	CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (TONS/SQ FT)		N VALUE * (BLOWS/FT)	RELATIVE DENSITY
FINE GRAINED SOILS	0 - 2 3 - 4 5 - 8 9 - 16 17 - 32	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF	0 - 0.25 0.25 - 0.50 0.50 - 1.00 1.00 - 2.00 2.00 - 4.00	COARSE GRAINED SOILS	0 - 4 5 - 10 11 - 30 31 - 50 > 50	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE

ASTM D 1586; NUMBER OF BLOWS OF 140 POUND HAMMER FALLING 30 INCHES TO DRIVE A 2 IN. O.D., 1 1/2 IN. I.D. SAMPLER ONE FOOT.

	GRAIN SIZE TERMINOL	OGY
Soil Fraction	Particle Size	U.S. Standard Sieve Size
Boulders	Larger than 12"	Larger than 12"
Cobbles	3" to 12"	3" to 12"
Gravel: Coarse	3/4" to 3"	3/4" to 3"
Fine	4.76 mm to 3/4"	#4 to 3/4"
Sand: Coarse	2.00 mm to 4.76 mm	#10 to #4
	0.42 mm to 2.00 mm	
Fine	0.074 mm to 0.42 mm	#200 to #40
	0.005 mm to 0.074 mm	
	Smaller than 0.005 mm	

#### ORGANIC CONTENT BY COMBUSTION METHOD

Soil Description	Loss on Ignition
Non OrganicLes	s than 4%
Organic Silt/Clay	4-12%
Sedimentary Peat	12-50%
Fibrous and	More
Woody Peat	than 50%

#### RELATIVE PROPORATIONS OF COHESIONLESS SOILS

Proportional Term	Defining Range By Percentage of Weight
Trace	0% - 5%
Little	5% - 12%
Some	12% - 35%
And	35% - 50%

#### **GENERAL TERMINOLOGY**

Physical Characteristics - Color, moisture, grain shape, fineness, etc. Major Constituents - Clay, silt, sand, gravel Structure - Laminated, varved, fibrous, stratified, cemented, fissured, etc.

Geologic Origin - Glacial, alluvial, eolian, residual, etc.

#### **DESCRIPTION OF BORING LOG HEADINGS**

No. = Sample number within the boring.

Rec. = Amount of sample recovery.

Moist = Visual estimate of the amount of moisture in the sample.

= Sampler type and sample interval. Type

N Value = The penetration resistance, N, is the sum of blows required to effect two successive 6" penetrations of the 2" split-spoon sampler per ASTM D1586.

Depth = Depth below ground surface.

Visual

PID

Classification = Lithologic symbol of soil or rock type; Description of stratigraphy; Borehole material graphics.

= Penetrometer Reading, tons/sq. ft. Q a

= Photoionization detector reading. Values are recorded as benzene equivalent units in ppm above background (0 = background reading).

Other environmental analyses may be reported. Results are provided as a value where quantifiable or as zero or ND when below detection limit.

#### **SYMBOLS**

#### SAMPLE TYPE

#### Unsampled interval

#### 2" outside diameter split spoon sampler

- 3" outside diameter split spoon sampler
- 3" Shelby tube
- 5' continuous sampler

Drilled by hollow stem augers; not sampled; logged by cuttings

Hand sample from surface

4" outside diameter core barrel sampler

Drilled by rotary wash bore; not sampled; logged by cuttings

- W Moisture Content, %
- LL Liquid Limit, %
- PL Plastic Limit, %
- LI Loss on Ignition, %
- D Dry Unit Weight, Ibs./cu. ft.
- or Acidity

#### LABORATORY TESTS

- pH Measure of Soil Alkalinity

#### WELL GRAPHICS

Concrete surface seal around well casing

Bentonite slurry or cementbentonite grout around well casing

Bentonite pellet seal around well casing

Fine filter sand backfill around well casing

Sand backfill around well casing

Sand filter pack around well screen

Sand backfill or natural soil collapse in borehole

Bentonite seal in borehole

Gravel backfill around well casing

Gravel backfill around vertical slot gas well

Gravel backfill around a leachate well

Gravel backfill around a perforated gas well

Gravel base material

#### DRILLING AND SAMPLING

- RC Rock Coring (Size)
- RQD Rock Quality Designator
- RB Rotary Boring
- DM Drilling Mud
- CW Clear Water
- AR Air Rotary
- DC Drove Casing (Size)
- HSA Hollow Stem Auger
- FA Flight Auger
- HA Hand Auger

#### WATER LEVEL MEASUREMENT

- ot = Water level at time shown
- NW No Water Encountered
- WD While Drilling
- BCR Before Casing Removal
- ACR After Casing Removal
  - AD After Drilling

NOTE: Water level measurements shown on the baring logs represent conditions at the time indicated and may not reflect static levels.



2100 Corporate Drive Addison, IL 60101 TEL. (708) 691-5000

### **UNIFIED SOIL CLASSIFICATION SYSTEM**

#### UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART COARSE-GRAINED SOILS (More than 50% of material is larger than No. 200 sieve size.) Clean Gravels (Less than 5% fines) Well-graded gravels, gravel-sand mixtures, little or no fines GW **GRAVELS** Poorly graded gravels, gravel-sand More than 50% GP mixtures, little or no fines of coarse fraction larger Gravels with Fines (More than 12% fines) than No. 4 GM sieve size Silty gravels, gravel-sand-silt mixtures Clayey gravels, gravel-sand-clay GC mixtures lean (Less than 5% fines) Well-graded sands, gravelly sands, little or no fines SANDS Poorly graded sands, gravelly sands, 50% or more SP little or no fines of coarse fraction smaller ands with Fines (More than 12% fines) than No. 4 sieve size SM Silty sands, sand-silt mixtures SC Clayey sands, sand-clay mixtures FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.) Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey SILTS silts with slight plasticity AND Inorganic clays of low to medium CLAYS CL plasticity, gravelly clays, sandy clays, Liquid limit silty clays, lean clays less than 50% Organic silts and organic silty clays of low plasticity Inorganic silts, micaceous or MH diatomaceous fine sandy or silty soils, SILTS elastic silts AND CLAYS Inorganic clays of high plasticity, fat CH clays Liquid limit 50% Organic clays of medium to high or greater plasticity, organic silts HIGHLY PT

gw	$C_u = \frac{D_{80}}{D_{10}}$ greater than 4; $C_c =$	$\frac{(D_{30})^2}{D_{10} \times D_{80}}$ between 1 and 3
GР	Not meeting all gradation require	ments for GW
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are
GC	Atterberg limits above "A" line with P.I. greater than 7	barderline cases requiring use of dual symbols
sw	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c =$	(O <sub>30</sub> ) <sup>2</sup> D <sub>10</sub> XD <sub>40</sub> between 1 and 3
SP	Not meeting all gradation require	ments for SW
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4
sc	Atterberg limits above "A" line with P.I. greater than 7	and 7 are borderline cases requiring use of dual symbols

**PLASTICITY CHART** 60 50 CH 30 CI MH L OH 20 ML & OL 80 LIQUID LIMIT (LL) (%)

GW, GP, SW, SP GM, GC, SM, SC

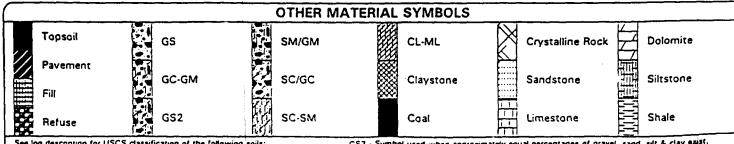
Borderline cases requiring dual symbols

coarse-grained soils are classified as follows:

Less than 5 percent

5 to 12 percent

More than 12 percent



See log description for USCS classification of the following soils: SMIGM & SCIGC - Symbols are used to differentiate SM, GM, SC & GC soils.

Peat and other highly organic soils

ORGANIC

SOILS

GS2 - Symbol used when approximately equal percentages of gravel, sand, salt & clay exist. GS - Symbol used for GP, GW, SP or SW soils with nearly equal sand and gravel.



### LOG OF TEST BORING

Project Blackwell Forest Preserve

Location Warrenville, Illinois

Boring No. \_\_\_\_G142\_\_\_
Job No. \_\_\_1252008.051602
Sheet \_\_\_\_\_1 of 1
Surface Elevation
Northing: \_\_\_\_\_

Easting: 2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

	_					T	OU Corporate Drive, Addison, minors COTOT, FEE.			00::	200	
<u>_</u>			AM			1	VISUAL CLASSIFICATIO	N				PERTIES
N	lo.		Mois- ture	N Value	Depth (ft.)		and Remarks			qu (qa) (tef)	PID (ppm)	Remarks
-	1	4	D	16	-		Brown, Fine SAND and SILT, Roots (TOPSOIL)		411444		0.0	
							Brown, Fine to medium SAND (SP)					
-	2	4	D	16					Ш		0.0	
	3	8	D	42	- 5- -		Little Limestone Gravel, Trace Silt at 6.0	ft			0.0	
۔ ا ک					<u>-</u>				H			
	4	10	D	73	10-				64 64 64 64 64 64 64 64 64 64 64 64 64 6		0.0	
	5	12	M	55	- - -		Brown/Gray, Fine to Coarse SAND, Little Gravel, Trace Silt (SP)	•			0.0	
	6	7	М	28	<u> </u>		Brown/Gray, Medium to Coarse SAND ar	nd			0.0	
	7	4	w	31	-		GRAVEL (GS)			<b></b>	0.0	
	8	8	W	19	-		Trace Silt at 17.0 ft				0.0	
ا ب	•		"	17	20-		·				0.0	
					- - - - - - 25-		End of Boring at 21.0 ft					
					- - - - 30		EVEL ODGEDVATIONS	<del></del>				
-							LEVEL OBSERVATIONS	-	G	ENERA		
	Ti De	hile D me Af epth to epth to	ter Di Wate	rilling er		_ft.	Upon Completion of Drillingft.	Logger Drill M	Rock AN lethoo	6/97 End &SoilChie ⁄IH Edito I Rotary	or	97 Rig Acker
/		The stra	tificati n may	on line be gra	s represe dual.	nt the	e approximate boundary between soil types and the	SS on	2 1/2'	Centers		LACZ IO CHICAGO



#### **LOG OF TEST BORING**

Project Blackwell Forest Preserve

Location Warrenville, Illinois

Boring No. G143

Job No. 1252008.051602

Sheet 1 of 1

Surface Elevation

Northing:

Easting: 2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

	S	AM	PLE				VISUAL CLASSIFICATIO			1	PRO	PERTIES
8	LI:	Mois-	N	1	pth		and Remarks	• •		qu (qa)	PID	
No.	(in.)	ture	Value	(f	t.)	24. ***.1			- <del>12</del>	(tsf)	(ppm)	Remarks
					5				20200000000000000000000000000000000000			Boring drilled with no sampling. See boring log P3 for stratigraphy.
				F								
1	6	M	26	F	10-		Brown, Fine SAND, Some Silt and Grave	el (SP)			0.0	
2	12	W	38	E			Brown/Gray, Medium to Coarse SAND, S Gravel (SP)	Some			0.0	
3	6	w	34	E	15		Brown/Gray, Medium to Coarse SAND a GRAVEL (GS)	nd			0.0	
4	12	w	46	E							0.0	
5	10	w	27	E							0.0	
				E	20-	y. • N	End of Boring at 20.0 ft			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
				11.1.1.1.	25—							
	<del>1</del>	<u> </u>	N	<u> </u>	TE	RI	EVEL OBSERVATIONS		GI	NERA	L NO.	TES
Tir De De	nile Dine Affi pth to pth to The stra	ter Dr Wate Cave	illing r in	s rep		ft.		Logger	10/1 Rock JM lethod	/97 End &SoilChief IK Edito Rotary	10/1/ r 4 1/4 " )	

#### G144 Boring No. LOG OF TEST BORING Job No. 1252008.051602 MONTGOMERY Sheet 1 of 1 WATSON **Blackwell Forest Preserve** Project Surface Elevation Location Warrenville, Illinois Northing: Easting: 2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000 SOIL PROPERTIES SAMPLE VISUAL CLASSIFICATION PID Rec. Mois-Depth and Remarks (qa) (ppm) (in.) ture Value (ft.) Remarks (tsf) Brown, Fine SAND and SILT (TOPSOIL) 0.0 37 1 D Brown, Silty SAND with Cobbles (SM) 0.0 2 D 29 Brown, Silty SAND and GRAVEL (GS) 0.0 10 M 39 0.0 <u>39</u> 14 Gray, Silty SAND and GRAVEL, Some Cobbles (GS) 0.0 5 28 0.0 6 M 35 Gray, Stiff CLAY (CL) 13 M 23 0.0 End of Boring at 17.5 ft 20 25-WATER LEVEL OBSERVATIONS **GENERAL NOTES** ₹ 6.5 ft. Upon Completion of Drilling ₹ 10/6/97 End ft. Start 10/6/97 While Drilling

Time After Drilling Depth to Water

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Depth to Cave in

Driller Rock&SoilChief

SS on 2 1/2' Centers

Logger

BPG

Editor

Drill Method Rotary 4 1/4 " ID HSA; 18"

Rig Acker

CaRUNACE ID: CHICAGO



#### **LOG OF TEST BORING**

Project Blackwell Forest Preserve

Location Warrenville, Illinois

Boring No. G145
Job No. 1252008.051602
Sheet 1 of 3
Surface Elevation
Northing:
Easting:

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

	S	AM	PLE		VISUAL CLASSIFICATION	SOIL	PROF	PERTIES
No.	LI	Mois- ture	N Value	Depth (ft.)	and Remarks	qu (qø) (tsf)	PID (ppm)	Remarks
			10	_	Brown, Silty, Organic SILT, Some Clay, Little Gravel, Some Roots (ML)		0.0	
1	15	D	39	-    -			0.0	
2	8	M	18	 -	Gray CLAY, Trace Gravel and Silt (CL)		0.0	
	L	141	10	- - 5-	Glay CEAT, Flace Graver and Birt (CE)		0.0	
3	18	M	13	-			0.0	
				-	Brown, Silty, Organic SILT, Some Clay, Little Gravel, Some Roots (ML)  Gray CLAY, Trace Gravel and Silt (CL)			
4	5	М	26	-			0.0	<u>.                                      </u>
				10-				
5	13	D	35	1.1	<u> </u>		0.0	
					Light Brown, Fine SAND and SILT, Little Gravel (SM)  Fine to Medium SAND at 14.0 ft  Brown/Gray, Fine to Coarse SAND, Some Gravel (SP)			
6	14	D	45	_ 	Fine to Medium SAND at 14.0 ft		0.0	
7	11	W	·56	- 15- - -	Brown/Gray, Fine to Coarse SAND, Some		0.0	Spoon wet.
	11	<b>W</b>	30	<u> </u>	Gravel (SP)		0.0	
8	12	w	26	E	. 1		0.0	Sand blowing
Ů	<u> </u>			20-	Light Brown CLAY, Trace Gravel (CL)			into au
	12	W	27	<u> </u>	Gray, Fine to Medium SAND (SP)	1	0.0	Sand blowing
9	13	<b>w</b>	21		Light Brown CLAY, Trace Gravel (CL)  Gray, Fine to Medium SAND (SP)  Gray, Fine to Coarse SAND, Little Gravel (SP)		0.0	into augers.
10	18	W	34				0.0	Sand blowing
		<u> </u>		- 25-			_	into augers.
11	18	W	43	F			0.0	Sand blowing
		-						into augers.
12	-		NA	<u> </u>	No Sample, 2.0 ft Blow-in			Sand blowing into augers.
				30-				
			W	ATE	LEVEL OBSERVATIONS G	ENERAL	TON	ES
w	ule Di	rilling	몿			3/97 End	10/3/9	
	ne Afi				Driller Rock			Rig Acker
	pth to pth to				Logger ANDrill Method			D HSA; 6
<del>-</del>		tification	on line	representual.	he approximate boundary between soil types and the 1/4" ID HSA		oller bit	



### LOG OF TEST BORING

Project Blackwell Forest Preserve

Location Warrenville, Illinois

Boring No. G145

Job No. 1252008.051602

Sheet 2 of 3

Surface Elevation

Northing:

Easting:

_					21	00 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-500	0			
		AM				VISUAL CLASSIFICATION		SOIL		PERTIES
No.	Rec.	Mois- ture	N Value	Depth (ft.)	<u> </u>	and Remarks		(qa) (tsf)	PID (ppm)	Remarks
13	18	W	44	-					0.0	Add water to augers to maintain head
14	18	W	39	- - - 35- - - -		No Sample, 2.0 ft Blow-in  2.0 ft Blow-in  No Sample  Gray, Stiff CLAY, Trace Gravel (CL)			0.0	against blow-in.
15	4	W	NA	- - - 40- - - -		2.0 ft Blow-in  No Sample  Gray, Stiff CLAY, Trace Gravel (CL)			0.0	Driller reports difficult drilling (clay) at 42'.
16	8	М	30	- - - 45-					0.0	
17	18	M	54 N/A	<u>-</u>		1			0.0	Drill to 45' w/ 3 3/4" ID HSA; withdraw and drill to bedrock
18			NA	- 50- - 55- - 60-		LIMESTONE/DOLOMITE Bedrock, Very Fractured, Weathered, Broken up (LIMESTONE)  LIMESTONE/DOLOMITE Bedrock (LIMESTONE)				with 6 1/4" ID  HSA.  SS/Auger refusal at 48.5'.  Driller reports bedrock is fractured and weathered to 53'.  4" ID steel casing set at 54'.  Driller reports that bedrock seams less competent than at G146; drilling rate faster.



#### **LOG OF TEST BORING**

Project Blackwell Forest Preserve

Location Warrenville, Illinois

Sheet 3 of 3
Surface Elevation
Northing:
Easting:

Boring No. G145

Job No. 1252008.051602

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

_	_					21	00 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5	5000			
		S	AM	PLE			VISUAL CLASSIFICATION		SOIL		PERTIES
No.	MOK	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		and Remarks		qu (qa) (tsf)	PID (ppm)	Remarks
					- 65- 65- 		End of Boring at 67.0 ft				Maintained water circulation. No water lost.
					70 70    						)
		-			- - 75- - - - -					d	
					- - 80- - - - -						
					<b>85</b> -						
					 90-    						



### **LOG OF TEST BORING**

Project Blackwell Forest Preserve

Location Warrenville, Illinois

Boring No. G146

Job No. 1252008.051602

Sheet 1 of 3

Surface Elevation

Northing:

SAMPLE  VISUAL CLASSIFICATION and Remarks  Visual CLASSIFICATION and Remarks  Brown/Gray SAND and GRAVEL (GS)  Red/Brown, Silty CLAY, Little Sand (CL)  Light Brown SAND and GRAVEL (GS)  Brown/Gray SILT and Fine Sand, Trace Gravel (ML)  GRAVEL (GP)  GRAVEL (GP)  GRAVEL (GP)  GRAVEL (GP)  GRAVEL (GP)	SOI qu (ap) (tef)	L PRO PID (ppm)	Remarks  Boring drilled with no sampling. See boring log P3 for stratigraphy.
Rec. Mois- (ft.)  No. (in.) ture Value (ft.)  Brown/Gray SAND and GRAVEL (GS)  Red/Brown, Silty CLAY, Little Sand (CL)  Light Brown SAND and GRAVEL (GS)  Brown/Gray SILT and Fine Sand, Trace Gravel (ML)  GRAVEL (GP)  Brown SAND and GRAVEL, Little Clay and Silt (GS)	(qa) (tsf)	1	Boring drilled with no sampling. See boring log P3 for stratigraphy.
Red/Brown, Silty CLAY, Little Sand (CL)  Light Brown SAND and GRAVEL (GS)  Brown/Gray SILT and Fine Sand, Trace Gravel (ML)  GRAVEL (GP)  Brown SAND and GRAVEL, Little Clay and Silt (GS)	1		with no sampling. See boring log P3 for stratigraphy.
25-			Soil descriptions based on surface soil cuttings. Driller says drilling difficult due to gravel and some clay.  Driller says drilling much easier at 15'.
	SENERA 1/97 End		
While Drilling   ft. Upon Completion of Drilling   Time After Drilling  Depth to Water  Depth to Cave in   The stratification lines represent the approximate boundary between soil types and the transition may be gradual.  Transition may be gradual.  Transition may be gradual.  Transition may be gradual.  Transition may be gradual.  Transition may be gradual.		ief itor	Rig Acker



#### **LOG OF TEST BORING**

Project Blackwell Forest Preserve

Location Warrenville, Illinois

Sheet 2 of 3
Surface Elevation
Northing:
Easting:

Boring No. G146\_

Job No. **1252008.051602** 

							21	100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000	Easting:		
			S	ΑM	PLE			VISUAL CLASSIFICATION	SOIL	PRO	PERTIES
	No.	Yell	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		and Remarks	qu (qa) (tsf)	PID (ppm)	Remarks
A TAN						35-		Brown SAND and GRAVEL (GS)			Driller reports drilling becoming more diffica
						- - - - - - - - - - - - - - - - - - -		Brown SAND and GRAVEL (GS)			•
						- 55 - 55 - 60 		LIMESTONE/DOLOMITE Bedrock (LIMESTONE)			Auger refusal a 55'. Set 4" ID steel casing at 56'. Drill through bedrock with 3 7/8" roller bit. Driller reports bedrock is competent.



#### **LOG OF TEST BORING**

Project Blackwell Forest Preserve

Location Warrenville, Illinois

Boring No. G146

Job No. 1252008.051602

Sheet 3 of 3

Surface Elevation

Northing: \_\_\_\_\_\_
Easting:

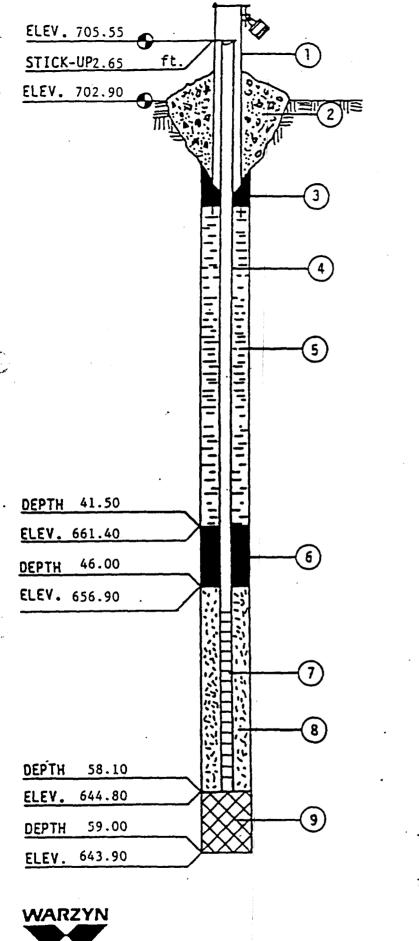
			2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000													
	SAMPLE			VISUAL CLASSIFICATION			SOIL PROPERTIES			PERTIES						
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)					Rema				qu (qa) (tsf)	- 1	PID pm)	Remarks
				 - _ 65_ - _												Maintained
				- - -				<u> </u>								water circulation. N
,				- 70- - -			En	d of Bo	oring at	68.7 ft						
				- - - -												
				- - 75- - -												
		!														
				- 80- - -												
				-												
				- 85- - -				-								
				- 1												
				- - - -												
				95- - -												

£3)

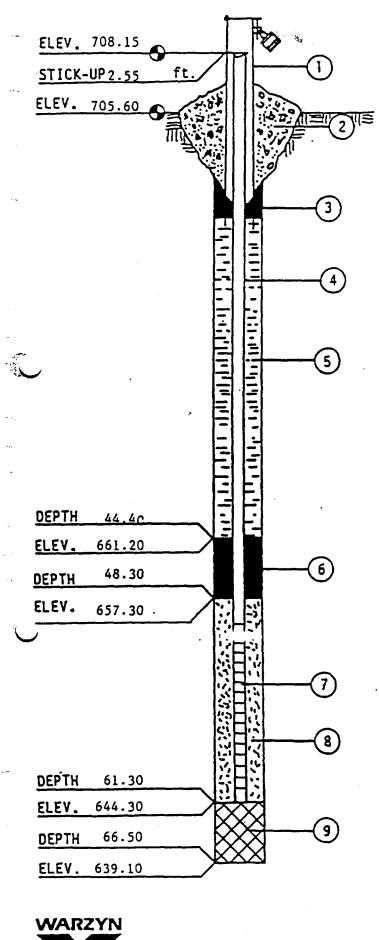
В

#### APPENDIX B

## MONITORING WELL/PIEZOMETER CONSTRUCTION DETAILS



[CHI-801-27]



Project Number		60721		
De	scription	Blackwell		
	ring/ ell No <u>G-14</u>	11D Date <u>6/18/91</u>		
1.	Protective Ca	sing Yes		
	Locking	Yes		
2.	Concrete Seal	Yes		
3.	Type of Surface Seal (if Installed)			
4.	Solid Pipe Type	304 Stainless Steel		
	Solid Pipe Length	53.3		
	Joint Type	Threaded		
5.	Type of Backfill	Bentonite-Cement		
	Backfill Installed Tremie			
6. —	Type of Lower Seal (if installed)  Bentonite Pellets			
7.	Screen Type	Stainless Steel		
	Screen Length	10.7		
	Slot Size	0.010		
	Slotted Intervi Length	ai 10.3 ft.		
	Screen Diameter	2 inch		
8.		fill around Screen orado Silica Sand		
9.	Type of Backfill	Drill Cuttings		
10.	Drilling Method	4-1/4" HSA		
11.	Additives Use	ed (if any)		
		None		
	All Depths Measured from Ground Surface Water Level 16.59 Date 6/19/91			

[CHI-801-27]

Monitoring Well Construction Information





21.0

NA

21.0

DEPTH

ELEV. DEPTH

ELEV.

DEPTH

ELEV.

#### MONITORING WELL DETAIL SHEET ELEV. PROJECT Blackwell Forest Preserve BORING/WELL NO. G142 ELEV. 10-6-97 2.5 STICK UP DATE PROJECT NUMBER 1252008.051602 ELEV. 1. PROTECTIVE CASING DIMENSIONS NA LENGTH. DEPTH 5.0 DIAMETER 6x6" squar Annular Seal, Top LOCK? X YES NO ELEV. VENTED WELL CAP? X YES NO 2. SURFICIAL SEAL MATERIAL Concrete (4) \_\_\_\_YES X NO 3. SAND DRAINAGE? 4. SOLID PIPE TYPE Type 304 Stainless Steel **SOLID PIPE LENGTH** 5. ANNULAR SEAL MATERIAL 〔5) NA **HOW INSTALLED VOLUME PLACED** DEPTH 2.0 Bentonite Seal, Top ELEV. 6. BENTONITE SEAL **Bentontie Chips** 150 lbs. = 1.5 DEPTH NA **VOLUME PLACED** Fine Sand, Top ELEV. 7. SCREEN MATERIAL Type 304 Stainless Steel 9.0 DEPTH SCREEN MANUFACTURER Johnson-Wheelabrator SCREEN LENGTH 10.0 Filter Pack, Top SLOT SIZE 0.010 FLEV. 11.0 SLOTTED INTERVAL LENGTH 9.7 DEPTH SCREEN DIAMETER I.D. Screen Joint, Top ELEV. 8. FILTER PACK MATERIAL No. 5 Silica Sand 200 lb = 2.0**VOLUME ADDED**

Well Bottom

Filter Pack, Bottom

Borehole, Bottom

11. BOREHOLE DIAMETER 8.0 in.

INSTALLED BY Rock & Soil SUPERVISED BY AMH

9. BACKFILL MATERIAL (BELOW FILTER PACK)

10. DRILLING METHOD Rotary with 4 1/4" I.D. HSA

None

(ALL DEPTHS MEASURED FROM GROUND SURFACE)



#### ELEV. ELEV. 1 STICK UP ft ELEV. NA DEPTH ft Annular Seal, Top ELEV. 4 5 DEPTH 2.5 ft ELEV. <u>n</u> NA 6) DEPTH Fine Send, Top ELEV. n DEPTH 8.2 Filter Pack, Top Æ۷. n 10.0 DEPTH Screen Joint, Top ELEV. 8 DEPTH 20.0 ft Well Bottom <u>T</u> ELEV. DEPTH NA Filter Pack, Bottom ELEV. <u>î</u>t 20.0 9 **DEPTH** Borshole, Bottom ELEV.

PROJECT Blackwell Forest Pres	erve
BORING/WELL NO. G1	43
DATE 10	-1-97
PROJECT NUMBER 12	52008.051602
1. PROTECTIVE CASING DIMENSIONS  LOCK? VENTED WELL CAP?	LENGTH 5.0 ft  DIAMETER 6x6" square  X YES NO  X YES NO
2. SURFICIAL SEAL MATERIAL	
3. SAND DRAINAGE?	YES X NO
4. SOLID PIPE TYPE Ty SOLID PIPE LENGTH	pe 304 Stainless Steel ft
5. ANNULAR SEAL MATERIAL HOW INSTALLED VOLUME PLACED	NA R3
6. BENTONITE SEAL VOLUME PLACED	Bentontie Chips 150 lbs. = 1.5 ft 3
7. SCREEN MATERIAL Ty SCREEN MANUFACTURER	pe 304 Stainless Steel Johnson-Wheelabrator
SCREEN LENGTH SLOT SIZE SLOTTED INTERVAL LENGTH	10.0 ft 0.010 in. 9.7 ft
SCREEN DIAMETER I.D.	in. O.D. in.
8. FILTER PACK MATERIAL	No. 5 Silica Sand  200 lb = 1.5 ft <sup>3</sup>
9. BACKFILL MATERIAL (BELOW None	/ FILTER PACK)
10. DRILLING METHOD Rotary	with 4 1/4" I.D. HSA
11. BOREHOLE DIAMETER	8.0 in.
INSTALLED BY Rock & Soil	SUPERVISED BY AMH



#### ELEV. ELEV. STICK UP 2.5 ELEV. 3 NA îŧ DEPTH Annular Seal, Top ELEV. 4) 5 2.0 DEPTH îŧ Bentonite Seal, Top ELEV. **n**⊕ 6) NA DEPTH Fine Sand, Top ELEV. <u>n</u> 5.0 DEPTH Filter Pack, Top <u>\_w</u> ELEV. 7.0 DEPTH Screen Joint, Top ELEV. DEPTH 17.0 îŧ Well Bottom ELEV. n<sup>®</sup> NA DEPTH Filter Pack, Bottom ELEV. **π**⊕ 17.5 DEPTH Borehole, Bottom ELEV.

PROJECT Blackwell Forest Pr	reserve
BORING/WELL NO.	G144
DATE	10-6-97
PROJECT NUMBER	1252008.051602
1. PROTECTIVE CASING DIMENSIONS  LOCK? VENTED WELL CAP?	LENGTH 5.0 ft. DIAMETER 6x6" square X YES NO X YES NO
2. SURFICIAL SEAL MATERIAL	<del></del>
3. SAND DRAINAGE?	YESX_NO
4. SOLID PIPE TYPE  SOLID PIPE LENGTH	Type 304 Stainless Steel
5. ANNULAR SEAL MATERIAL HOW INSTALLED VOLUME PLACED	NA n
6. BENTONITE SEAL	Bentontie Chips 50 lbs = 0.5
7. SCREEN MATERIAL SCREEN MANUFACTURER SCREEN LENGTH SLOT SIZE SLOTTED INTERVAL LENGT SCREEN DIAMETER I.D.	Type 304 Stainless Steel    Johnson-Wheelabrator
8. FILTER PACK MATERIAL VOLUME ADDED	No. 5 Silica Sand 200 lbs = 2.0 ft
9. BACKFILL MATERIAL (BELO None	W FILTER PACK)
10. DRILLING METHOD Rote	ary with 4 1/4" I.D. HSA
11. BOREHOLE DIAMETER	8.0 in.
INSTALLED BY Rock & So	BPG BY BPG
IALL DEDTUS MEASURED E	POM GROUND SUBSACES



#### ELEV. ELEV. îŧ STICK UP 2.5 ELEV. 2.5 3 DEPTH îτ Annular Seal, Top ELEV. (4) 5 49.0 DEPTH ft Bentonite Seal, Top ELEV. <u>ir</u> 6) DEPTH NΑ Fine Sand, Top ELEV. 54.0 DEPTH Filter Pack, Top <u>r</u> DEPTH 56.0 Screen Joint, Top ELEV. 7 8 66.0 **DEPTH** Well Bottom ELEV. <u>#</u> DEPTH NA Filter Pack, Bottom ELEV. n 67.0 9) DEPTH Borehole, Bottom ELEV.

PROJECT Blackwell Fore	st Preserve			
BORING/WELL NO.	G145			
DATE	10-3-97			
PROJECT NUMBER	1252008.051602			
1. PROTECTIVE CASING				
DIMENSIONS	LENGTH 5.0 ft.			
	DIAMETER 6x6" square			
LOCK?	X YES NO			
VENTED WELL CAP?	X YES NO			
2. SURFICIAL SEAL MATE	RIAL Concrete			
3. SAND DRAINAGE?	YESXNO			
4. SOLID PIPE TYPE	Type 304 Stainless Steel			
SOLID PIPE LENGTH				
SOLID FIFE LENGTH	π			
5. ANNULAR SEAL MATER	RIAL Bentonite Grout			
HOW INSTALLED	Tremie			
VOLUME PLACED	30 gais = 4.0 ft <sup>3</sup>			
6. BENTONITE SEAL	Bentontie Chips			
VOLUME PLACED	40 lbs = 0.5 ft 3			
TOLOWIE / EACED	40 124 - 0.3			
7. SCREEN MATERIAL	Type 304 Stainless Steel			
SCREEN MANUFACTUR	ER Johnson-Wheelabrator			
SCREEN LENGTH	10.0 ft			
SLOT SIZE	0.010 in.			
SLOTTED INTERVAL LE	NGTH 9.7 ft			
SCREEN DIAMETER	I.Din. O.Din.			
8. FILTER PACK MATERIA				
VOLUME ADDED _	75 lbs = $0.75$ ft <sup>3</sup>			
9. BACKFILL MATERIAL (E No. 5 Silica Sand	ELOW FILTER PACK)			
	Rotary using HSA through Soil.			
10. DRILLING METHOD	Rotary with water using roller			
	bit in bedrock.			
11. BOREHOLE DIAMETER	in.			
INSTALLED BY Rock	& Soil SUPERVISED BY AMH			
(ALL DEPTHS MEASURED FROM GROUND SURFACE)				

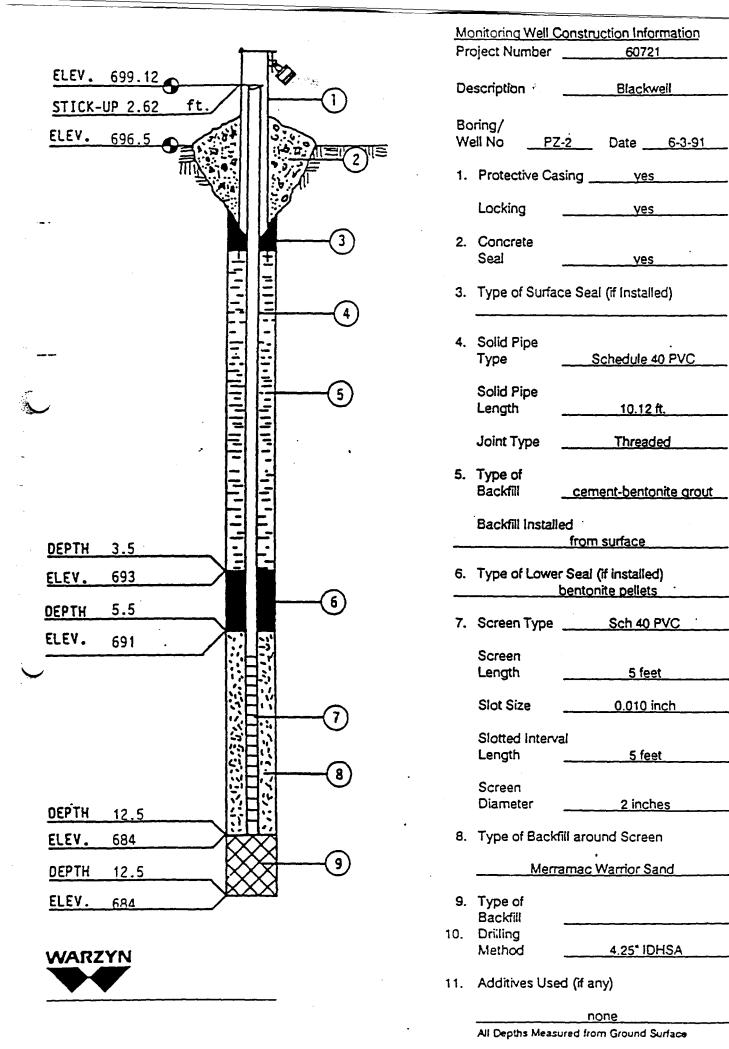


ELEV.

#### ELEV. P 8 ELEV. C 2.5 ft STICK UP ELEV. 3 3.0 DEPTH ft Annuler Seal, Top ELEV. 4) 5 53.0 DEPTH Bentonite Seal, Top ELEV. n NA 6 DEPTH Fine Sand, Top ELEV. <u>n</u> 56.0 DEPTH Filter Pack, Top LEV. <u>n</u> DEPTH 58.7 ELEV. 68.7 ft 8 **DEPTH** Well Bottom <u>r</u> ELEV. NA DEPTH Filter Pack, Bottom ELEV. <u>r</u>⊕ 9 69.0 DEPTH

Borehole, Bottom

PROJECT Blackwe	ell Forest Pres	erve		
BORING/WELL NO.	G1	46		
DATE	10	-1-97		
PROJECT NUMBER	12	52008.051602		
1. PROTECTIVE CASI DIMENSIONS LOCK? VENTED WELL CA		LENGTH DIAMETER X YES X YES	5.0 ft. 6x6" square NO	
2. SURFICIAL SEAL N	ATERIAL	Concrete		
3. SAND DRAINAGE	·	YES X NO	)	
4. SOLID PIPE TYPE SOLID PIPE LENGT		pe 304 Stainless S	teel ft	
5. ANNULAR SEAL M HOW INSTALLED VOLUME PLACED		Bentonite ( Tremie gallons=4.0	Grout ft 3	
6. BENTONITE SEAL VOLUME PLACED	25	Bentontie Chips	n a	
7. SCREEN MATERIA SCREEN MANUFA SCREEN LENGTH SLOT SIZE SLOTTED INTERVA SCREEN DIAMETE	CTURER  AL LENGTH	De 304 Stainless S  Johnson-Wheela 10.0  0.010  9.7  in. O.E	abrator ft	
8. FILTER PACK MAT	TERIAL	No. 5 Silica Sand 80 lb = 0.75	<u>i</u> 1	
9. BACKFILL MATER None	IAL (BELOW	FILTER PACK)		
10. DRILLING METHO	D Rotary	using HSA throug with water using re edrock.		
11. BOREHOLE DIAME		10.	0 in.	
INSTALLED BY	Rock & Soil	_SUPERVISED E	Y AMH	
(ALL DEPTHS MEASURED FROM GROUND SURFACE)				



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#### APPENDIX C

MONITORING WELL/PIEZOMETER INTEGRITY EVALUATION FORMS



Date: Monitoring Well No.:	9/24/97 P-2	Bott-cutted lock off; replaced
Monitoring Well Lock:	Satisfactory Or Unsatisfactory	Remarks: immed w/ FPD master lock
Monitoring Well Secure	Yes or No	Remarks:
Protective Casing:	Satisfactory or Unsatisfactory	Remarks:
Material Between Casings:	Yes or No	Remarks:
Surface Seal Defects:	Cracked, Weak, or None	Remarks:
Well Casing Vent Hole	Yes or No	Remarks: Put vent hole in
Kinking or Obstructions	Yes or No	Remarks:
Photograph of Monitoring Well	Yeslor No	Remarks:
Screen Type:	PVC, SS or other	Remarks:
Total Depth of Well: Well Diameter:	14 94 ft	Remarks: Compared to historical into =15.16 Remarks:
Depth to Water Level from TOIC:	ft	Remarks:
Signature:	Brien P. House	



Date: Monitoring Well No.:	9/24/97	
Monitoring Well Lock:	Satisfactory or Unsatisfactory	Remarks:
Monitoring Well Secure	Yesor No	Remarks:
Protective Casing:	Satisfactory or Unsatisfactory	Remarks:
Material Between Casings:	Yes or No	Remarks: Material found@ ground level on by
Surface Seal Defects:	Cracked, Weak, or None	Remarks: Suface Soul haved 6-8"
Well Casing Vent Hole	Yes or No	Remarks: Put one in
Kinking or Obstructions	Yes or No	Remarks:
Photograph of Monitoring Well	Yesor No	Remarks:
Screen Type:	(PVC,)SS or other	Remarks:
Total Depth of Well: Well Diameter:	ft ft in	Remarks: Compared to historical info = 23 To Remarks:
Depth to Water Level from TOIC:	16.91 ft	Remarks:
Signature:	Bran L. These	·



Date:	7/29/97 6-131 D	
Monitoring Well Lock :	Satisfactory or Unsatisfactory	Remarks:
Monitoring Well Secure	Yes or No	Remarks:
Protective Casing:	Satisfactory or Unsatisfactory	Remarks:
Material Between Casings:	Yes or No	Remarks: 5" below grand surface
Surface Seal Defects:	Cracked, Weak or None	Remarks: heaved 1 inch
Well Casing Vent Hole	Yes or No	Remarks:
Kinking or Obstructions	Yes or No	Remarks:
Photograph of Monitoring Well	Yes or No	Remarks:
Screen Type:	(PV), SS or other	Remarks:
Total Depth of Well: Well Diameter:	54.1 ft -4 in	Remarks: Boring log: 53' bgs Remarks:
Depth to Water Level from TOIC:	<u>14.45</u> ft	Remarks:
Signature:	Indutt Kinel	Dedicated Bailer



Date: Monitoring Well No.:	9/23/97 G1310D	
Monitoring Well Lock :	Satisfactory or Unsatisfactory	Remarks: Lock has some just
Monitoring Well Secure	Yes or No	Remarks:
Protective Casing:	Satisfactory or Unsatisfactory	Remarks:
Material Between Casings:	Yes or No	Remarks: Material is found @ ground lavel only
Surface Seal Defects:	Cracked, Weak, or None	Remarks:
Well Casing Vent Hole	Yes or No	Remarks: Put one in
Kinking or Obstructions	Yes or No	Remarks:
Photograph of Monitoring Well	Yes or No	Remarks:
Screen Type:	(PVC) SS or other	Remarks:
Total Depth of Well: Well Diameter:	<u>64-6</u> ft 4 in	Remarks: TOIC / instruction = 63 bg Remarks:
Depth to Water Level from TOIC:	14.7 ft D. M.	Remarks:



Date: Monitoring Well No.:	9/23/97 G132D	
Monitoring Well Lock:	Satisfactory or Unsatisfactory	Remarks:
Monitoring Well Secure	(Yes)or No	Remarks:
Protective Casing:	Satisfactory or Unsatisfactory	Remarks:
Material Between Casings:	Yes or No	Remarks: Material @ ground level only
Surface Seal Defects:	Cracked, Weak, or None	Remarks:
Well Casing Vent Hole	Yes or No	Remarks: Put hole en
Kinking or Obstructions	Yes or No	Remarks:
Photograph of Monitoring Well	Yesor No	Remarks:
Screen Type:	PVC SS or other	Remarks:  Bonny 19733ft by 5 . 1 /
Total Depth of Well: Well Diameter:		Remarks: Compared to historical, into. TOIC Remarks:
Depth to Water Level from TOIC:	28.1 fy	Remarks:
Signature:	Buan & tres	



Date: Monitoring Well No.:	9/13/47	
Monitoring Well Lock:	Satisfactory or Unsatisfactory	Remarks:
Monitoring Well Secure	Yesor No	Remarks:
Protective Casing:	Satisfactory or Unsatisfactory	Remarks:
Material Between Casings:	Yes or No	Remarks: Moderal found@ grandlevel only
Surface Seal Defects:	Cracked, Weak, or None	Remarks:
Well Casing Vent Hole	Yes on No	Remarks: Put Vent hole in
Kinking or Obstructions	Yesor No	Remarks: Can not get dedicated bailerout
Photograph of Monitoring Well	Yes or No	Remarks:
Screen Type:	PVC SS or other	Remarks:
Total Depth of Well: Well Diameter:	ft in	Remarks: [well depth=103 5 bgs]  Remarks: [what rawe total depth as well depth is > Remarks:
Depth to Water Level from TOIC:	28 ft July	Remarks:
Signature:	1 men	



Date: Monitoring Well No.:	9/23/97	
Monitoring Well Lock:	Satisfactory or Unsatisfactory	Remarks:
Monitoring Well Secure	(e) or No	Remarks:
Protective Casing:	Satisfactory or Unsatisfactory	Remarks:
Material Between Casings:	Yes or No	Remarks: Mederial @ ground level only
Surface Seal Defects:	Cracked, Weak, or None	Remarks: 4-6" below ground on face
Well Casing Vent Hole	Yes or No	Remarks: Put vent hole in
Kinking or Obstructions	Yes or Wo	Remarks:
Photograph of Monitoring Well	Yes or No	Remarks:
Screen Type:	EVC SS or other	Remarks:  Bornig 10- = \$2'bas / 1
Total Depth of Well: Well Diameter:	83.1ft 4in	Remarks: Compared to his terical into. TOIC Remarks:
Depth to Water Level from TOIC:	28.4 ft	Remarks:
Ciam a Array	Bright -	



Date: Monitoring Well No.:	9/23/97	
Monitoring Well Lock:	Satisfactory or Unsatisfactory	Remarks: Cet lock off and replaced mined
Monitoring Well Secure	Yes)or No	Remarks:
Protective Casing:	Satisfactory or Unsatisfactory	Remarks:
Material Between Casings:	Yes or No	Remarks: Material @ ground level only
Surface Seal Defects:	Cracked, Weak, or None	Remarks: Good condition
Well Casing Vent Hole	Yes or No	Remarks: Put vent hole in
Kinking or Obstructions	Yes or No	Remarks:
Photograph of Monitoring Well	(Ves) or No	Remarks:
Screen Type:	eVC)SS or other	Remarks:
Total Depth of Well: Well Diameter:	<u>57.9</u> ftin	Remarks: Compared to Listence into . TOI ( Remarks:
Depth to Water Level from TOIC:	10.5 ft	Remarks:
Signature	Frian Shean	<b>_</b>

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#### APPENDIX D

MONITORING WELL DEVELOPMENT FORMS



1. Can this well be purged dry?

### **MONITORING WELL DEVELOPMENT SUMMARY**

Project Name	Blackwell Forest Preserve	Well No.	G107S
Location	Warrenville, IL	Project No.	1252008.051602
Developed By	JMK, BPG	Checked By	

1. Can this w	ell be purged dry	?	Yes [	] No			Before I	Development	Af	ter Development	
					10 Depth						
2. Well deve	lopment method				(from t	op of sing)	al	5.65	· <sup>ft.</sup>   —	3 4.70	
surged wit	h bailer and baile	d					ļ				
	h bailer and pum				Date:		b. 9	/ 25 / 97	1	9 / 25 / 9	
	h block and baile		ō				mm		. !	mm dd yy	
, -	h block and pump		ō					□ a.m		a.n	
1	surged with block, bailed and pumped				Time:		c. 17 :	05 <b>p</b> .m		: 38 <b>p</b> .r	
compresse		• •							-		
bailed only					11 Sedime	ent in well	İ				
pumped or					bottom	:		. inch	es	. inc	
pumped sle	owly				1		-				
Other	surged w/ pump	periodically	y 🗆		12 Water	Observations:	Clear		Cle	ear 📺	
			•		}		Turbid		Tu	rbid 🔲	
3. Time spent	developing well		·	8 5 min.	<u> </u>		(Descri	be)	(D	escribe)	
						Color	Light C	iray	.	Clear	
4. Total well			3	9. <u>0</u> ft.	1	Odor	4		.	<b>_</b>	
(From well	construction sum	mary)			l	Turbidity	Turbid		.	None	
						HNu			.		
Measured v	vell depth (Before	e) (TOIC)	4	0.6 ft.			<u> </u>				
					Filter Pack	Vol. (gallons)	$0.16(R^2 - r^2)$	)is = _		6.9	
Measured v	vell depth (After)	) (TOIC)	4	0.2 ft.							
	6 11		!	•	Well casing Vol. (gallons) $0.16r^2 1 = 16.0$						
<ol><li>Inside dian</li></ol>	peter of well		<del> 4</del> ·.	— — in.	Saturated length of and east (6 \ /la)						
6. Volume of	water in filter pa	ck and well	2	2.9 gal.	Saturated length of sand pack (ft.) (ls)3 . 6						
casing					Length of water column (ft.) (l) 2 5.0						
7. Volume of	water removed fr	om well	1 0	5 . gal.		of borehole (in					
			_		Collect groundwater sample if drilling fluids were used and well is						
Relative rea	covery rate		ft. per.	min.	at solid was	te facility:					
					13 Total suspended solids mg/l m <sub>1</sub>						
.8. Volume of	water added (if a	ny)	None	. gal.		l Unfiltered)	<b></b>		ing/		
	•	••		`		,			İ		
9. Source of v	water added			<del></del>	14. COD	1 77- Ch 1 C.	.16		mg/l	m	
		<u>r</u>		<u></u>		l Unfiltered Si	i i i	(BEFORE)		(AFTER)	
Time	Gallons Purged	pН	Spec. Cond. (umhos/cm)	T deg. C	Spec. Cond. at 25 deg. C		Odor	Turb. (NTU)	DO (mg/L)	Comments	
			<del>-`</del>		at 25 deg. C					Comments	
1719	20	7.29	208	11.21		Lt Gray	<u> </u>	96.6	1.42		
1732	35	7.26	204	10.71		Cloudy		9.0	0.59		
1,545	60	7.24	600	10.66					0.54		
1742	50	7.24	589	10.55		Clear	<del> </del>	14.1	0.76		
1800	65	7.24	471	10.66		Clear		1.5	0.28	_	
1817	80	7.23	590	10.60		Clear		2.2	0.49		
						1	ļ				
1828	95	7.23	591	10.41		Clear		2.5	0.42		
1837	105	7.24	592	10.37		Clear		1.4	0.65		
105,	<del>                                     </del>	<del>                                     </del>		-0.57		1		4. 4	0.05		
	<u>L</u>	<u> </u>	<u> </u>								
Notes: 1. P	urged dry at 23	3 gal.: 2. I	DO=Dissolved	Oxvaen							
	<u> </u>	,		73	····	<u></u> .	1	<u></u>	<u> </u>		

## MUNIGOMERY WATSON

#### WONITORING WELL DEVELOPMENT SUMMARY

Project Name	Blackwell Landfill	Well No.	G117	
Location	DuPage County	Project No.	3920.0041	
Developed By	DAP/ACC	Checked By		

<u></u>	11 b				<u> </u>					1	David	
11. Can this we	ell be purged dry?		☐ Yes ■	■ No	10	Depth to	Water	Betore D	evelopment	All	er Development	
1	opment method					(from top well casir	of	a1	4.92	ft	1 4.9 2 ft.	
	bailer and bailed				•	Davis		. 10	122 1 06		10 / 21 / 04	
_	n bailer and pumpe n block and bailed					Date:		b. 10 mm	/ 23 / 96 dd yy		10 / 24 / 96 nm dd yy	
_	block and pumpe							a.m.	- 1	GL		
surged with compressed	i block, bailed and Lair	l pumped				Time:		c. <u>10</u> :		12	: <u>00</u> <b>p</b> .m.	
bailed only			ā		11	Sediment	in well					
pumped on						bottom:			inch	es	inches	
pumped slo Other	iwiy				12	Water Oh	servations:	Clear	_	Cle	ar 📟	
					'-	Water Oo	sci vations.	Turbid		l l	bid 🗀	
3. Time spent	developing well			9 0 m	in.			(Descri	be)	(De	escribe)	
	Lumon (	<b>-</b> a.			l		Color	Clear			Clear	
	depth (TOC) (Construction summer			<u>9.0</u> ft.			Odor Turbidity	None None		.	None None	
(From won')	construction sum						HNu	N/A	<del></del>		N/A	
Measured w	rell depth (Before)	•	3	0.0 ft								
Measured w	ell depth (After)		3	<u>0</u> . <u>0</u> ft	.			0.057(R <sup>2</sup> - r <sup>2</sup>	•		4.3	
5. Inside diam	eter of well		4.0 0 in.			Well casing Vol. (gallons) $0.16r^21 = 9.7$						
. Inside diali	vi Woll		<u></u>			Saturated length of sand pack (ft.) (ls) 1 2.0						
6. Volume of casing	water in filter pac	k and well	2	4.4 g		ngth of wate	er column (f	t.) (l)	•	1	5.08	
7. Volume of	water removed fro	om well	2 4	0.0 ga					l radius (in.)			
Relative rec	overy rate		ft. per.	m		llect ground solid waste		le if drilling	fluids were use	ed and w	ell is	
					13	3 Total sus	pended soli	ds		mg/l	mg/l	
8. Volume of	water added (if ar	ıy)	None	g			Infiltered)		· · · · · · · · · · · · · · · · · · ·			
Source of v	vater added		None		14	. COD				mg/l	mg/l	
<u> </u>						(250 ml Unfiltered Su		ılfuric)	(BEFORE)		(AFTER)	
Time	Gallons Purged	pН	Spec. Cond.	T deg. C		Cond. deg. C	Color	Odor	Meter Turb.	D.O.	Comment	
1052	30	6.60	700	12.5			Clear	None	0.19	2.2		
1100	50	6.90	685	12.6			Clear	None		2.19		
1115	100	7.20	588	12.5			Clear	None	0.10	2.15		
1130	150	7.34	570	12.5			Clear	None	0.10	2.15		
1144	200	7.40	570	12.5			Clear	None	0.02	2.1		
1200	240	7.54	574	12.5			Clear	None	0.02	2.13		



### MONITORING WELL DEVELOPMENT SUMMARY

Project Name	Blackwell Forest Preserve	Well No.	G118S
Location	Warrenville, IL	Project No.	1252008.051602
Developed By	JMK, BPG	Checked By	

1. Can this well be purged dry?				] No			Before l	Development	Af	ter Developmen
2. Well devel	opment method				10 Depth to (from to well cas	p of	a	7.98	ft	1 7.65
_	h bailer and baile h bailer and pum				Date:		b. 9	/26 / 97		9 / 26 / 9
1	h block and baile		<u> </u>		1		mn	dd yy	'   j	mm dd yy
surged with block and pumped					1			a.m.	.	☐ a.r
1 -	h block, bailed an	d pumped			Time:		č. <u>11</u> :	59 □ p.m.	. 13	: 05 <b>m</b> p.r
compresse										
bailed only			Φ_		11 Sedimer	it in well	ŀ		ļ	
pumped or	*		#		bottom:		_	inch	es	inc
pumped sie	owly surged w/ pump :	naciodiaall	у <u>ф</u>		12 Water O	bservations:	Clear	_	Cle	
	developing well	periodican	y w	5 6 min		OSCI VALIOIIS.	Turbid (Descr	_	Tu	rbíd   escribe)
J. Line open	. co. c. c. c. c. c. c. c. c. c. c. c. c. c.		<del>+</del>			Color	Clear	,		Clear
4. Total well	depth (bgs)		2	1.0 ft.	1	Odor				
· <b>g</b>	construction sum	mary)				Turbidity	None			None
	,,					HNu				
Measured v	vell depth (Before	:) (TOIC)	2	2.9 ft.						
	_				Filter Pack V	ol. (gallons)	$0.16(R^2 - r^2)$	)ls =		2.8
Measured v	vell depth (After)	) (TOIC)		3.0 ft.	Well casing Vol. (gallons) 0.16r <sup>2</sup> 1 = 3.1					
5. Inside dian	neter of well		4.	in.	Saturated length of sand pack (ft.) (ls) 1.5					
6. Volume of casing	water in filter pad	ck and well		5.9 gal.	Length of water column (ft.) (1) 4.9					
7. Volume of	water removed fr	om well	4	l. gal.	R = Radius o	f borehole (ir	ı.) r≃We	ll radius (in.)		
							le if drilling	fluids were us	ed and	well is
Relative rea	covery rate		ft. per.	min	at solid waste	e facility:				•
8. Volume of	water added (if a	ny)	None	gal.	13 Total suspended solids mg/l (500 ml Unfiltered)					
9. Source of	vater added			· 	14. COD (250 ml	Unfiltered St	ulfuric)	(BEFORE)	mg/l	(AFTER) M
Time	Gallons Purged	pН	Spec. Cond. (umhos/cm)	T deg. C	Spec. Cond. at 25 deg. C	Color	Odor	Turb. (NTU)	DO (mg/L)	Comments
1211	5	6.70	465	11.88	<u></u>	Clear		4.1	1.93	
1215	10	6.64	453	11.83		Clear		2.5	1.23	
1221	15	6.64	455	12.37		Clear		4.0	1.72	
1231	20	6.66	449	11.72		Clear		63.2	1.42	
1239	25	6.69	445	11.28		Clear		30.2	1.02	
1247	30	6.75	440	12.23		Clear		29.8	0.78	
1255	35	6.64	442	12.04		Clear		19.9	0.84	
1304	41	6.65	439	11.64		Clear		19.6	1.17	
Notes: 1. Purg	ged dry after 10 gal	(recharges	quickly); 2. DO =	Dissolved O	ygen		<u> </u>			

Project Name	Blackwell Landfill	Well No.	G121	
Location	DuPage County	Project No.	3920.0041	
Developed By	DAP/ACC	Checked By		

D. Carabian	ويجل المحمدية وط ألام	<del> </del>	Van	N/-			Patara D	lammant	1 46	or Davidson and
1. Can this w	ell be purged dry?		□ Yes I	No	10 Depth to	Water	Before De	evelopment	All	er Development
2. Well devel	lopment method				(from top	p of	a1	1.62	ft	1 1.6 5 ft.
	h bailer and bailed									
	h bailer and pump h block and bailed				Date:		b. <u>10</u>	/ 23 / 96 dd yy		10 / 25 / 96 mm dd yy
	h block and pumpe						111111	□ a.m.	- 1	mm dd yy ■ a.m.
surged wit	h block, bailed and		ā		Time:		c. <u>12</u> : _	30 📰 p.m.		_ : <u>00</u> 🗖 p.m.
compresse										
bailed only pumped or					11 Sedimen bottom:	t in well		inche		inches
pumped sle	-				Dottoin.		_		.3	
Other	Surged with Pum	ip			12 Water O	bservations:	Clear		Cle	ar 🔳
							Turbid	<b>.</b>		rbid 🖂
3. Time spen	t developing well			2 0 mi		Color	(Describ Black/G	•	(De	escribe) Clear
4. Total well	depth <del>(TOC)</del> — (0	GS)	2	0 . 0 ft.	1	Odor	Septic	· <i>j</i>		Slight Septic
	construction sum					Turbidity	Turbid			None
-			•		1	HNu				
Measured v	vell depth (Before)	,		<u>0</u> .6 ft.	· · · · · · · · · · · · · · · · · · ·		0.000.04 /			
Measured v	vell depth (After)		2	0 . 8 ft.	Filter Pack Vo	ol. (gallons)	0.057(R*- r*)	)ls = _		<u>0</u> . <u>7</u>
1	-	•			Well casing V	/ol. (gallons)	0.16r <sup>4</sup> 1	= _		5.7
5. Inside diar	neter of well			. <u>0 0</u> in	Saturated leng	gth of sand pa	ck (ft.) (ls)			9.0
6. Volume of casing	water in filter pac	k and well	1	$\frac{6}{4}$ ga	il. Length of wat	ter column (fi	· ) (II)	-		. 9 8
	-ع د							-	<u>-</u>	· <u>·</u>
/. Volume of	water removed from	om weii	<u> </u>	<u>0</u> . <u>0</u> ga	I. R = Radius of Collect groun				d and w	ell is
Relative re-	covery rate		ft. per.	m	in. at solid waste		o ii diiiiiig ii		o ano "	C.17 13
			•		13 Total sus		is	;	mg/l	mg/l
8. Volume of	water added (if ar	ny)	None	ga	il. (500 ml <sup>1</sup>	Unfiltered)				
9. Source of	water added		None		14. COD				mg/l	mg/l
<b>_</b>						Unfiltered Su	lfuric)	(BEFORE)	ı	(AFTER)
Time	Gallons Purged	рН	Spec. Cond.	T deg. C	Spec. Cond. at 25 deg. C	Color	Odor	Meter Turb.	D.O.	Comment
940	25	12.4	550	13.5		Lt. Gray	Septic	33.50	1.61	200 NTU for
945	40	12.4	545	13.7		Lt. Gray	Septic	18.80	1.64	Turbidity
948	70	12.5	545	13.8		Lt. Gray	Septic	8.90	1.69	200 NTU for
952	90	12.6	545	14.0		Clear	SI. Septic	8.90	1.63	Turbidity
957	110	12.6	545	14.0		Clear	Sl. Septic	8.90	1.60	
J:\3920\Gint\G	121-DEV xls			<del></del>			•			

# MONTGOMERY N WATSON Pr

10	NITOR	ING	WELL	DEVEL	OPM	ENT	SUN

1	MONITORI	NG WELL DEVELOPMEN	IT SUMMARY		
	Project Name	Blackwell Forest Preserve	Well No.	G121	•
	Location	Warrenville, IL	Project No.	1252008.0	5160
	Developed By	JMK, BPG	Checked By		

1. Can this w	ell be purged dry	?	☐ Yes ■	No			Before I	Development	Af	ter Developmen
2. Well devel	opment method				10 Depth to	p of	a. 1	1.81	ft.	1 1.82
surged with	h bailer and baile	d			well cas	ing)		<del></del>	`   <del>-</del>	·
	n bailer and pump				Date:		b. 9	/ 25 / 97		9 / 25 / 9
_	h block and bailed		Ö				mm	<del></del>	`	mm dd yy
surged with	h block and pump	ed						☐ a.m.		☐ â.
surged with	h block, bailed an	d pumped			Time:		c. <u>14</u> :	55 <b>p</b> .m.	. 16	: <u>00</u> <b>p</b> .
compressed										
bailed only			0		11 Sedimen	it in well				
pumped on pumped slo	•				bottom:			inch	ස	·_ in
	surged w/ pump ;	periodically			12 Water O	bservations:	Clear		Cle	ear 📟
,	organ w part		, 4				Turbid		1	rbid 🗆
3. Time spent	developing well			4 6 min.			(Descri	be)	(D	escribe)
						Color	Gray			Clear
4. Total well				<u>0.0</u> ft.	1	Odor	· <del></del>			
(From well	construction sum	mary)	-			Turbidity	Turbid	<del></del>		None V
Measured u	ell depth (Before	) (TOIC)	2	1.2 ft.		HNu				
TATIONS AND AND	en acpui (Detaie	, (1010)		<u> </u>	Filter Pack V	ol (gallons)	0.16092 - =2	)Is =		5.4
Measured v	vell depth (After)	) (TOIC)	2	1.2 ft.	I HICK TACK V	or. (Barrous)	0.10(12 -1	,ıs – .		<del></del>
172000000	on coput (1 zon)	,(-0.0,	<del></del> -	<u> </u>	Well casing	/ol. (gallons)	0.16r <sup>2</sup> 1	=		6.0
5. Inside diam	eter of well		4.	in.				-		
6 Volume of	water in filter pac	or and wall	1	1.4 gal.	Saturated len	gth of sand p	ack (ft.) (ls)	-	<del></del>	2.8
casing	water in inter par	A ALIC WELL		1 . 4 gai.	Length of wa	ter column (f	L) (l)			9.4
7. Volume of	water removed fr	om well	8	0 . gal.	R = Radius o	f borehole (in	.) г= Wei	ll radius (in.)		
			<del></del>				le if drilling	fluids were us	ed and	well is
Relative rec	covery rate		ft. per.	min.	at solid waste	e facility:				
					13 Total sus	spended solid	ds		mg/l	π
8. Volume of	water added (if a	ny)	None	gal.		Unfiltered)	. [			
9. Source of v	vater added			•	14. COD		1		mg/l	π
y. Boulet of v	value added					Unfiltered St	ılfuric)	(BEFORE)	g.,	(AFTER)
	Gallons		Spec. Cond.	T	Spec. Cond.			Turb.	DO	
Time	Purged	pН	(umhos/cm)	deg. C	at 25 deg. C	Color	Odor	(NTU)	(mg/L)	Comments
1512	10	7.32	228	13.25	·	Lt. Gray		2.1	0.86	
1516	20	7.32	224	13.24	<del> </del>	Clear		3.1	0.93	<u>-</u>
1524	30	7.27	652	13.04		Clear		2.6	1.66	
1527	40	7.25	651	13.02		Clear		1.4	0.52	
1536	50	7.26	242	13.02		Clear		2.6	1.79	
1539	60	7.26	267	12.99		Clear		2.2	1.93	
1546	70	7.27	239	12.99		Clear		2.7	2.10	
1551	80	7.27	276	13.06		Clear		1.4	2.20	
Note: DO =	Dissolved Ox	cygen								
			1							

Project Name	Blackwell Landfill	Well No.	G122	
Location	DuPage County	Project No.	3920.0041	
Developed By	DAP/ACC	Checked By		

1. Can this w	ell be purged dry?		☐ Yes	■ No	10 Depth to	Water	Before I	Development	Aft	er Development
2. Well devel	opment method				(from to	p of	a <u>_</u> 1	4.44	ft	1 4.4 0 f
	h bailer and bailed				j	•				
	h bailer and pump				Date:			) / 23 / 96	-	10 / 28 / 96
	h block and bailed h block and pumpe						mm	n dd yy <b>m</b> a.m.		nm dd yy ■ a.m.
_	h block, bailed and				Time:		c. 9 :	_		: 00 p.m.
compresse										_ · U P
bailed only					11 Sedimen	it in well				
pumped on					bottom:			inch	es	inche
pumped sid	owly				12 1/2	·	Class		CI-	
Other					12 Water O	bservations:	Clear Turbid		Cle Tur	
3. Time speni	developing well			3 0 m	in.		(Descri			scribe)
1	. 0					Color	Clear	•	1	Clear
	depth <del>(TOC)</del> — ((		2	5.5 ft		Odor	None			None
(From well	construction sumr	nary)				Turbidity	Clear			Clear
Managered	vell depth (Before)		2	5 6 6	ļ	HNu	N/A		.	N/A
T Measured v	ven depin (Betore,	,		5.6 ft			0.053/04	431-	<del></del>	3 3
Measured v	vell depth (After)		2	5 . 6 ft	Filter Pack V	oi. (gailons)	0.05/(R <sup>2</sup> - r	f)ls = _		3.3
I Wicasurea V	ven depuir (riner)	•		<u> </u>	Well casing	Vol. (gallons)	0.16r <sup>4</sup> 1	=		7 . 1
5. Inside dian	neter of well		4	. 0 0 in	1	,		•		
					Saturated len	gth of sand pa	ack (ft.) (ls)			1.2
6. Volume of casing	water in filter pac	k and well	2	0.4 ga	l. Length of wa	iter column (f	t.) (l)		1	. 1 . 2
7. Volume of	water removed fro	om well	1 2	<u>0</u> . <u>0</u> ga						
Relative red	covery rate		ft. per.	m	in. at solid waste		ie it drilling	fluids were use	ed and w	ell is
					12 Total su	spended soli	da		mg/l	mg/l
8. Volume of	water added (if ar	1y)	None	g		Unfiltered)	.		mg/t	
							1		ĺ	
9. Source of	water added		None		14. COD	11-6b4 C	.16		mg/l	mg/l
<b>→</b>	Gallons	,	Spec.	1 7	Spec. Cond.	Unfiltered St	lituric)	(BEFORE) Meter	<del></del>	(AFTER)
Time	Purged	pН	Cond.	deg. C	at 25 deg. C	Color	Odor	Turb.	D.O.	Comment
945	20	7.14	840	12.7		Clear	None	Clear	1.49	
950	40	6.90	840	13.2		Clear	None	Clear	1.28	
955	60	6.83	834	13.4		Clear	None	Clear	1.30	
1000	80	6.93	835	13.4		Clear	None	Clear	1.20	
1005	100	6.89	838	13.3		Clear	None	Clear	1.24	
1010	120	6.90	835	13.3		Clear	None	Clear	1.20	
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74	I.		1	
L٦	11	17	,	

	JHING WELL DEVELOPMENT SUMMARY
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Project Name	Blackwell Landfill	Well No.	G123
Location	DuPage County	Project No.	3920.0041
Developed By	DAP/ACC	Checked By	

1	s well be purged dry	?	☐ Yes	No No			Before	Development	Al	fter Development
	evelopment method				10 Depth to (from to wen cas	p of	a	1 5.30	ft.	1 5.3 0
surged surged surged surged	with bailer and bailer with bailer and pump with block and bailer with block and pump with block, bailed an	ped d ped	00000		Date:		mr	0 / 25 / 96 m dd yy ■ a.m		10 / 25 / 96 mm dd yy a.m. 0 : 05 □ p.m.
bailed of	•				11 Sedimer bottom:	nt in well	_	inch	nes	inch
Other	<del></del>				· 12 Water O	bservations:	Clear Turbio	<b></b>	1	ear <b>=</b>
3. Time s	pent developing well		<del></del>	2 0 min	1.	Color	(Desc Clear	_		Pescribe) Clear
	rell depth <del>(TOC)</del> (vell construction sum		2	1.5 ft.		Odor Turbidity HNu	None Clear N/A			None Clear N/A
Measure	ed well depth (Before	;)	2	2.0 ft.						
Measure	ed well depth (After)		2	2.0 ft.	Filter Pack V	-		r²)ls =		8.0
5. Inside o	liameter of well	•	4	. <u>0</u> <u>0</u> in.	Well casing \ Saturated len	_		,		6.7
6. Volume casing	of water in filter pac	ck and well	1	2.3 gal				,		6.7
					1					
7. Volume	e ot water removed tr	rom well		5.0 gal				ell radius (in.)		
İ	e ot water removed to recovery rate		ft. per	<u>5 . U</u> gal	Collect groun	dwater samp		ell radius (in.) fluids were us	ed and w	vell is
Relative					Collect groun at solid waste	dwater samp	le if drilling		ed and w	well ismg/
Relative	recovery rate		ft. per.	mir	Collect groun at solid waste 13 Total su (500 ml	idwater samp facility: spended solic	le if drilling			
Relative	e recovery rate		ft. per.	mir	Collect groun at solid waste 13 Total su (500 ml	dwater samp e facility: spended solid Untiltered)	le if drilling	fluids were us	mg/i	mg/
Relative 8. Volume 9. Source	e recovery rate e of water added (if a of water added Gallons	nny)	ft. per. None  None  Spec.	mir gal	Collect groun at solid waste  13 Total su (500 mi  14. COD (250 mi  Spec. Cond.	idwater samp e facility: spended solid Untiltered) Untiltered Su	le if drilling	(BEFORE)	mg/i	mg/
Relative 8. Volume 9. Source	e recovery rate  e of water added (if a  of water added  Gallons  Purged	pH	ft. per.  None  Spec. Cond.	gal T deg. C	Collect groun at solid waste  13 Total su (500 mi  14. COD (250 mi  Spec. Cond.	dwater samp e facility: spended solid Untiltered) Untiltered Su	le if drilling	(BEFORE)  Meter Turb.	mg/l mg/l D.O.	mg/  (AFTER)  Comme  200 NTU Sale
8. Volume 9. Source Time 845	e recovery rate e of water added (if a of water added  Gallons Purged  25	рн 9.66	None  Spec. Cond. 566	T deg. C 13.7	Collect groun at solid waste  13 Total su (500 mi  14. COD (250 mi  Spec. Cond.	dwater samp c facility: spended solu Untiltered) Untiltered Su Color Clear	ds (Ituric) (Vdor	(BEFORE)  Meter Turb.  11.36	mg/l mg/l  D.O. 2.80	mg/  (AFTER)  Comme 200 NTU Sale
8. Volume 9. Source Time 845 852	e recovery rate  e of water added (if a of water added  Gallons Purged  25  40	pH 9.66 9.45	None  None  Spec. Cond.  566  597	T deg. C 13.7 13.8	Collect groun at solid waste  13 Total su (500 mi  14. COD (250 mi  Spec. Cond.	dwater samp e facility: spended solid Untiltered)  Untiltered St  Color  Clear	ds dilturic)  Odor  None  None	(BEFORE) Meter Turb. 11.36	mg/l mg/l D.O. 2.80 1.85	mg/  (AFTER)  Comme 200 NTU Sale
8. Volume 9. Source Time 845 852 855	e recovery rate e of water added (if a of water added  Gallons Purged  25  40  55	рн 9.66 9.45 9.42	None  None  Spec. Cond.  566 597 600	T deg. C 13.7 13.8 14.0	Collect groun at solid waste  13 Total su (500 mi  14. COD (250 mi  Spec. Cond.	dwater samp facility: spended solid Untiltered)  Untiltered St  Color  Clear  Clear  Clear	ds (lturic)  Odor  None  None	(SEFORE)  Meter 1 urb.  11.36  3.74  2.60	mg/l D.O. 2.80 1.85 2.03	mg/  (AFTER)  Comme 200 NTU Sale
8. Volume 9. Source  Time 845 852 855 900	c recovery rate c ot water added (it a ot water added Gallons Purged 25 40 55 70	pH 9.66 9.45 9.42 9.47	None  None  Spec. Cond.  566 597 600 498	T deg. C 13.7 13.8 14.0 14.1	Collect groun at solid waste  13 Total su (500 mi  14. COD (250 mi  Spec. Cond.	dwater samp e facility: spended solid Untiltered)  Untiltered Su  Color  Clear  Clear  Clear  Clear	e if drilling  ds  Udor  None  None  None  None	(BEFORE) Meter Turb. 11.36 3.74 2.60 2.50	mg/l mg/l  D.O.  2.80 1.85 2.03 1.98	mg/  (AFTER)  Comme 200 NTU Sale
8. Volume 9. Source  Time 845 852 855 900	c recovery rate c ot water added (it a ot water added Gallons Purged 25 40 55 70	pH 9.66 9.45 9.42 9.47	None  None  Spec. Cond.  566 597 600 498	T deg. C 13.7 13.8 14.0 14.1	Collect groun at solid waste  13 Total su (500 mi  14. COD (250 mi  Spec. Cond.	dwater samp e facility: spended solid Untiltered)  Untiltered Su  Color  Clear  Clear  Clear  Clear	e if drilling  ds  Udor  None  None  None  None	(BEFORE) Meter Turb. 11.36 3.74 2.60 2.50 2.20	mg/l mg/l  D.O.  2.80 1.85 2.03 1.98	mg/  (AFTER)  Comme 200 NTU Sale
8. Volume 9. Source  Time 845 852 855 900	c recovery rate c ot water added (it a ot water added Gallons Purged 25 40 55 70	pH 9.66 9.45 9.42 9.47	None  None  Spec. Cond.  566 597 600 498	T deg. C 13.7 13.8 14.0 14.1	Collect groun at solid waste  13 Total su (500 mi  14. COD (250 mi  Spec. Cond.	dwater samp e facility: spended solid Untiltered)  Untiltered Su  Color  Clear  Clear  Clear  Clear	e if drilling  ds  Udor  None  None  None  None	(BEFORE) Meter Turb. 11.36 3.74 2.60 2.50	mg/l mg/l  D.O.  2.80 1.85 2.03 1.98	mg/  (AFTER)  Comme 200 NTU Sale
8. Volume 9. Source  Time 845 852 855 900	c recovery rate c ot water added (it a ot water added Gallons Purged 25 40 55 70	pH 9.66 9.45 9.42 9.47	None  None  Spec. Cond.  566 597 600 498 601	T deg. C 13.7 13.8 14.0 14.1	Collect groun at solid waste  13 Total su (500 mi  14. COD (250 mi  Spec. Cond.	dwater samp e facility: spended solid Untiltered)  Untiltered Su  Color  Clear  Clear  Clear  Clear	e if drilling  ds  Udor  None  None  None  None	(BEFORE) Meter Turb. 11.36 3.74 2.60 2.50 2.20	mg/l mg/l  D.O.  2.80 1.85 2.03 1.98	mg/  (AFTER)  Comme 200 NTU Sale

#### WONTOKING WELL DEVELOPMENT SUMMAKY

Project Name	Blackwell Landfill	Well No.	G126	
Location	DuPage County	Project No.	3920.0041	
Developed By	.DAP/ACC	Checked By		

			· · · · · · · · · · · · · · · · · · ·			r <del></del>				<del></del>	
1. Can this w	vell be purged dry?	•	☐ Yes i	No		10 Depth to	Water	Before D	evelopment	Afte	r Development
	lopment method					(from to	p of	a1	2.3 6 ft	·	1 2.3 6 ft
surged with	th bailer and bailed th bailer and pump th block and bailed	ed I				Date:		b. <u>10</u>	/ 23 / 96 dd yy	- 1	10 / 28 / 96 nm dd yy
	th block and pumpe th block, bailed and td air					Time:		c. <u>11</u> :	■ a.m. 30 □ p.m.	8	■ a.m. : <u>30</u> □ p.m.
bailed only pumped of pumped sl	nly					11 Sedimen bottom:	t in well	<del></del>	inches		inche
Other			. –			12 Water O	bservations:	Clear Turbid		Clea	oid 🗀
,	t developing well depth <del>(TOC)</del> ((	GS)		1 5 1 7.71			Color Odor	(Descrii Clear None	De)		scribe) Clear None
	construction sum						Turbidity HNu	Clear N/A		_	Clear N/A
Measured v	well depth (Before)	)	1	9.3	ft.	Filter Pack V	ol (gallons)	0.057(P <sup>2</sup> - r <sup>2</sup>	)ls =		8.3
Measured	well depth (After)		1	9.3	ft.	Well casing \			= -		4.4
5. Inside dia	meter of well		4	. <u>0</u> <u>0</u> i	n.	Saturated len	_		-	<b>-</b> -	6. 9
6. Volume of water in filter pack and well1 _ 2 . 7 gal. casing				gal.	Length of wa	ter column (f	t.) (l)			6.9	
7. Volume of	t water removed tr	om well		<u>v.v</u>	gal.	K = Kadius o		<u> </u>			
Relative re	covery rate		ft. per.	'	min.	at solid waste		ie it aniling i	luids were used	and we	en is
8. Volume o	t water added (it ai	ny)	None	:	gai.		spended solic Untiltered)	1s	n	ıg/l	mg/l
9. Source of	water added		None			14. COD (250 ml	Untiltered Su	iltunc)	(BEFORE)	ıg/I	(AFTER) mg/l
Time	Gallons Purged	pН	Spec. Cond.	T deg. C		Spec. Cond. at 25 deg. C	Color	Udor	Meter Turb.	D.U.	Comment
8:10	15	6.78	1360	13.0	<u> </u>		Clear	None	Clear	1.62	
8:12	25	6.90	1140	14.0			Clear	None	Clear	1.47	
8:15	40	6.89	1110	14.1	$oxed{oxed}$		Clear	None	Clear	1.43	
8:20	60	6.73	1110	14.2	1		Clear	None	Clear	1.48	
8:24	70	6.79	1120	19.0			Clear	None	Clear	1.48	
								<u> </u>			
		<u> </u>									
				<u> </u>	_						
		<u> </u>		<u> </u>	$oldsymbol{ol}}}}}}}}}}}}}}}}}}$						
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Project Name	Blackwell Landfill	
Location	DuPage County	
Developed By	DAP/ACC	· · · · · · · · · · · · · · · · · · ·

Well No.	G127	
Project No.	3920.0041	
Checked By		

l.	Can this we	ell be purged dry?		☐ Yes ■	No				Before	Development	A	fter Development
2.	Well develo	opment method					10 Depth to (from top wen casi	of	a	1 4.6 0	_ft	1 4.60
l	surged with	bailer and bailed	[									
		bailer and pumpe					Date:		b	10 / 23 / 90	<u>6</u>	10 / 25 / 96
	•	block and bailed		Ф		[			m	ım dd yy	_	mm dd yy
	_	block and pumpe		4		ŀ	! 			a.r	1	a.m.
	-	block, bailed and	1 pumped	₫			Time:		c. 12	: <u>00</u> 🗆 p.r	n.   11	<u> </u> : <u>30</u> □ p.m.
	compressed bailed only					- 1		:	]		]	
	pumped on			<u> </u>			11 Sediment bottom:	in well		inc	hac	inch :
	pumped slo	•					bottom.		-	_ <del></del> - ' '''	1162	<u></u> inche
	Other	,				- 1	12 Water Of	servations:	Clear	. =	Cı	ear <b>=</b>
Ì	,			_		İ			Turb			ırbid 🗇
3.	Time spent	developing well			2 4 n	nin.			(Desc	cribe)	(D	Pescribe)
l						- 1		Color	Clean		_	Clear
		lepth <del>(TOC)</del> — ((		1	9.0 ft	t.		Odor	None			None
1	(From well	construction sumr	nary)	1.		- 1		Turbidity	Clear	r	_	Clear
Ų,	Managard w	ell depth (Before)		2	0 0 6			HNu	N/A		-	N/A
ا	MICASHIER W	en achu (perore)	,	<u> </u>	<u>0.9</u> fi	"			<u> </u>			<u>_</u>
Ì.				i			Filter Pack Vo	ol. (gallons)	0.057(R <sup>2</sup> -	r <sup>2</sup> )ls =		7.5
'	measurea w	ell depth (After)		<del>+ _2</del>	0.9 fi	·	Wall sesing V	'al (aallans)	0.16-41	_		4 0
5.	5. Inside diameter of well 4.0 0 in.		n.	Well casing Vol. (gallons) $0.16r^21 = 4.0$								
			1 11	<b></b>		ı	Saturated leng	th of sand p	ack (ft.) (l	s)		6.3
0.	6. Volume of water in filter pack and well 1 1 5 gal. casing				ai.	Length of wat	er column (f	t.) (l)			6.3	
ļ.,	/. Volume of water removed from well / 0 . 0 gai.				_,	U — Uadwa at	hambala (im		dall madessa dem 3			
<b> </b> ''	Volume of water removed from well				ai.				Vell radius (in.) g fluids were u	sed and v	vell ic	
1	Relative recovery rate ft. per min.		nin.	at solid waste		ic ii diiiiii	ig tiulus wete u.	scu and v	ecii is			
							13 Total sus	pended solie	ds	1	mg/l	mg/l
8.	Volume of	water added (if ar	ıy)	None	_·_ g	al.	(500 m) (	Intiltered)		\	_	
У.	Source of v	vater added		None			14. COD				mg/l	mg/l
					<del></del>	ل		Intiltered Su	ulturic)	(BEFORE)	- ; 	(AFTER)
Į.	Time	Gallons Purged	, pH	Spec. Cond.	deg. C		pec. Cond. t 25 deg. C	Color	Udor	Meter Turb.	D.O.	Comm
<u> </u>	11:00	10		Working	13.4			ear/Lt Yell			1.80	200 NTU Sale
	11:04	20	Not	Working	13.4		CI	ear/Lt Yell	ow None	7.4	1.86	for Turbidity
	11:08	30	Not	Working	13.1		Ci	ear/Lt Yell	ow None	8.0	1.80	
	11:12	40	Not	Working	13.1			Clear	None	6.2	1.80	
	11:16	50	Not	Working	13.1			Clear	None	3.2	1.65	
	11:20	60	Not	Working	13.1			Clear	None	2.8	1.65	
	11:24	70	Not	Working	13.1			Clear	None	2.8	1.60	
Г					<u> </u>			· · · · · · · · · · · · · · · · · · ·			T	
Γ												
				<u> </u>		T						
_		• • • • • • • • • • • • • • • • • • • •		<del></del>								<del></del>

### MONITORING WELL DEVELOPMENT SUMMARY

W	

Project Name	Blackwell Forest Preserve	Well No.	G127
Location	Warrenville, IL	Project No.	1252008.051602
Developed By	JMK, BPG	Checked By	

<u></u>							<sub>+</sub>			
1. Can this w	ell be purged dry	?	☐ Yes ■	No			Before I	Development	Af	ter Development
2. Well devel	opment method				10 Depth to (from to well cas	pof	a1	4.35	n	1 4.3 2
surged with	h bailer and baile	d				6/			1	
1	h bailer and pump				Date:		ъ. 9	/ 25 / 97		9 / 25 / 97
surged with	h block and bailed	d					mm	dd yy	`   ;	mm dd yy
surged with	h block and pump	ed			1		] [	☐ a.m.	.	☐ a.m.
surged with	h block, bailed an	d pumped			Time:		c. <u>12</u> :	33 <b>m</b> p.m.	. 13	_ : _ 59 🔳 p.m.
compresse	d air				1					<del></del>
bailed only	,				11 Sedimen	t in well				
pumped on	dy				bottom:			inch	es	inch
pumped slo	owly							<del>-</del>	ŀ	
Other	surged w/ pump	periodically	y 🗆		12 Water O	bservations:	Clear		Cle	
	_						Turbid		1	rbid 🔲
3. Time spent	developing well			$\frac{5}{2}$ min.	l		(Descri	•	O	escribe)
1			_			Color	Lt Yell	ow/Tan		Clear
_	depth (bgs)		<u> </u>	9.0 ft.		Odor				
(From well	construction sum	mary)				Turbidity	Turbid		1.	None
			_		İ	HNu				
Measured v	vell depth (Before	:) (TOIC)	$-\frac{2}{}$	1.1 ft.						
					Filter Pack V	ol. (gallons)	$0.16(R^2 - r^2)$	)ls     =		3.9
Measured v	veli depth (After)	) (TOIC)		1.0 ft.			9 .			
E Toolds dism	6 V13. 31				Well casing \	/ol. (gallons)	0.16r <sup>2</sup> 1	= ,		4.4
5. Inside diameter of well in.				Saturated len	oth of eand n	eck (A ) (le)			2. 0	
6. Volume of water in filter pack and well 8.3 gal.				Saturated length of sand pack (ft.) (ls) 2 . 0						
casing					Length of wa	ter column (f	t) (1)	•		6.8
7. Volume of	water removed fr	om well	5	9 . gal.	R = Radius o	f borehole (is	n.) r=We	ll radius (in.)		
Į.			· <del></del> -				le if drilling	fluids were us	sed and	well is
Relative rea	covery rate		ft. per	min.	at solid waste	facility:				
1			-		12 7-4-1		ا ــــــــــــــــــــــــــــــــــــ			
Volume of	water added (if a	mv)	None	. gai.		spended soli Unfiltered)	as		mg/l	mg/
i volume or	water asset (ii a	<b>-1</b> 77		gai.	(300 mm	Ollinarca)	ļ			
9. Source of v	water added				14. COD		]		mg/l	mg/
					<del></del>	Unfiltered S	ulfuric)	(BEFORE)	' '	(AFTER)
T:	Gallons		Spec. Cond. (umhos/cm)	T dea C	Spec. Cond.	Cala	۸	Turb.	DO	Com
1307	Purged 4	pH 6.97	(umnos/cm) 336	deg. C	at 25 deg. C	Color Lig Yellov	Odor	(NTU) 14.7	(mg/L) 0.09	Comments
1317	6	6.94	914	12.94	<del></del>	Clear	1 411	14.7	1.31	<del> </del>
1314	9	6.91	922	12.40		Clear		6.9	0.79	ļ ————————————————————————————————————
1318	14	6.92	920	13.39		Clear	<del>                                     </del>	0.9	0.79	<del> </del>
1325	19	6.92	920	12.58		Clear	<del> </del>	3.4	0.50	<del> </del>
1328	24	6.89	894	12.61	<del></del>	Clear	<del> </del>	12.4	0.55	<del>                                     </del>
1332	29	6.91	895			Clear	<del> </del>	5.6	0.49	<del> </del>
1337	34	6,91	873	12.55	<u> </u>	Clear	<del>                                     </del>	4.6	0.43	<del>                                     </del>
1342	39	6.90	328	12.36		Clear	<del>                                     </del>	8.8	0.42	<del>                                     </del>
1345	44	6.91	328	12.38		Clear	<del> </del>	3.4	0.39	
1347	49	6.91	351	12.01		Clear	<del>                                     </del>	3.9	0.32	
1351	54	6.91	348	11.98		СІеаг	<del> </del>	2.9	0.30	<del> </del>
1359	59		332	11.97		Clear	<del>                                     </del>	3.2	0.29	
			<u> </u>			1	<u> </u>	<del></del>		

Note: DO = Dissolved Oxygen

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Project Name	Blackwell Landfill	Well No.	G128D
Location	DuPage County	Project No.	3920.0041
Developed By	DAP/ACC	Checked By	

1.	Can this we	ell be purged dry?	?	☐ Yes	■ No			Before	Development	Ai	ter Development
2.	Well develo	opment method				(from to		a	1 5.49	ft.	1 5.49 t
	surged with surged with surged with	n bailer and bailed n bailer and pump n block and bailed n block and pump n block, bailed and	ed ! ed	000000		Date:	sing <i>)</i>	mı	0 / 23 / 96  m dd yy  a.m  00  p.m		10 / 24 / 96 mm dd yy a.m.
	bailed only pumped on pumped slo Other	ly				bottom:	nt in well  Observations:	 Clear	inch		inche
3.	Time spent	developing well		· <del></del>	<u>7</u> <u>0</u> m	sin.	Color	Turbio (Desc	ribe)		escribe)
		depth <del>(TOC)</del> ((construction sum			4.5 ft		Color Odor Turbidity HNu	Clear None Cloud N/A			None Clear N/A
?	Measured w	ell depth (Before	)		6.4 ft		/ol. (gallons)	0.057/04	4.11-		
Measured well depth (After)  5. Inside diameter of well  6. Volume of water in filter pack and well			4	6.4 ft .0 0 ir 0.6 g	. Well casing  i. Saturated ler	Vol. (gallons)	0.16r <sup>4</sup> l	= .	<del></del>	- 4 · 4 - 6 · 2 - 2 · 0	
	casing			<del></del>			ater column (f	t.) (!)		4	0.9
	Volume of Relative rec	water removed to overy rate		2 <u>4</u> ft. per.	<u>U.U</u> g		ndwater samp		ell radius (in.) fluids were use	ed and w	ell is
გ.	Volume of	water added (if a	ny)	None	g		ispended solid Untiltered)	ds		mg/I	mg/l
9.	Source of v	vater added		None	<del></del>	14. COD (250 ml	Untiltered Su	iltune)	(BEFORE)	mg/l	mg/1
-	Time	Gallons Purged	рН	Spec. Cond.	T deg. C	Spec. Cond. at 25 deg. C	Color	Udor	Meter Turb.	D.O.	Comm
Ĺ	14:58	40	7.71	698	12.7		White Cloud	y None	159.5	2.10	200 NTU Sale
L	15:10	80	7.60	740	12.8		White Cloud	ly None	128.6	2.10	for Turbidity
L	15:22	120	8.40	735	12.4		Clear Lt. Gra	y None	37.5	2.06	
L	15:34	160	8.70	727 ·	12.4		Clear Lt. Gra	y None	25.4	2.05	
L	15:46	200	8.76	725	12.4		Clear Lt. Gra	y None	12.0	2.07	
-	16:00	240	8.76	730	12.4		Clear Lt. Gra	y None	10.1	2.04	

MICHALI CUMO	VV [ 1 1	DEVELVE	TIVICANA	SUMMEN

Project Name	Blackwell Landfill	Well No.	G129
Location	DuPage County	Project No.	3920.0041
Developed By	DAP/ACC	Checked By	

1. Can this we	eli be purged dry?		☐ Yes	No				Before D	evelopment	Aft	er Development
2. Well develo	opment method				10	Depth to		a.	9.90	ft.	9.901
1	h bailer and bailed	r				wen casi				-	
_	n bailer and pump					Date:		Ь. 10	/ 23 / 96		10 / 29 / 96
	block and bailed					Dute.		mm	dd yy	) i	nm dd yy
	n block and pumpe							-	a.m.	1	=== j j ==============================
1 -	block, bailed and					Time:		c. 2 :	_	1 .	: 00 p.m.
compressed		• •	ā							-	
bailed only					11	Sedimen	t in well				
pumped on	ly				1	bottom:			inch	es	inche
pumped slo	owly									- 1	
Other					12	Water Of	oservations:	Clear		Cle	·
<b> </b>								Turbid			rbid 🖂
3. Time spent	developing well			3 0 m	in.		<b>.</b> .	(Descri	be)	(De	escribe)
A Total well a	denth (TOC) (	7e\	,	7 5 6			Color Odor	Rusty			Slight Rust
	depth <del>(TOC)</del> (( construction sum			$\frac{7}{5}$ ft	.		Turbidity	Musty		i,	None Clear
(FIOIII WEIL)	COMMUNICATION SUMM	ııaı y ,					HNu	N/A		.	N/A
Measured w	ell depth (Before)	)	1	9.2 ft	.		11110				1417
<u> </u>						er Pack Vo	ol (gallons)	0.057(R <sup>2</sup> - r <sup>2</sup>	)is =		2. 0
Measured w	ell depth (After)		1	9.2 ft		ici rack vi	or (Sarious)	1- 21)100.0	,is – .		<del>_</del>
	• • •					ell casing V	ol. (gallons)	0.16r <sup>2</sup> 1	=		6.4
5. Inside diam	neter of well		4	. <u>0 0</u> in		urated leng	rth of sand n	ack (ft.) (ls)	•	— — 1	0. 2
L	water in filter pac	k and well	1	8.4 g	al.		-		•		
casing						_	er column (f		•	<u> </u>	0.2
7. Volume of	water removed tre	om well	1 2	<u>U</u> . <u>U</u> ga			borehole (in		l radius (in.)		-0:-
Relative rec	covery rate		ft. per.	m		solid waste		ie ii uriiiiig i	iluids were use	eu anu w	CII IS
					1.	i l'otal sus	pended solie	ts		mg/l	mg/
8. Volume of	water added (it ar	ıy)	None	_·_ g			Úntillered)				
9. Source of v	water added		None		14	. COD				mg/I	mg/.
<b></b>	т— <u>2-:. —</u>						Unfiltered St	ilturic)	(BEFORE)	·	(AFTER)
Time	Gallons Purged	рН	Spec. Cond.	T deg. C		Cond. deg. C	Color	Odor	Meter Turb.	ນ.ບ.	Comment
9:40	20	8.90	800	12.2			Rust	Musty	To High	3.40	200 NTU Sale
9:45	40	8.40	800	12.1			Rust	Musty	to Read	3.35	for Turbidity
9:50	60	7.79	805	12.3			Sl. Rust	None	104.0	2.89	
9:55	80	7.52	800	12.3			SI. Rust	None	75.0	2.86	
10:00	100	7.36	800	12.3			Sl. Rust	None	60.0	2.86	
10:50	120	7.35	800	12.3			Sl. Rust	None	56.0	2.86	
		ļ									
		<u> </u>									
<u> </u>		<u> </u>					ļ		<u> </u>		ļ
				<del> </del>						<u> </u>	
<u></u>	<b>!</b>	<u> </u>		<u>L</u>	 		<u> </u>	<u> </u>	<u> </u>	<u> </u>	L



Project Name	Blackwell Forest Preserve	Well No.	G130
Location	Warrenville, IL	Project No.	1252008.051602
Developed By	JMK, BPG	Checked By	

1. Can this w	ell be purged dry	?	☐ Yes ■	No	J		Before I	Development	Ai	ter Development
2 Well devel	opment method				10 Depth to		g 1	6.95	A	1 6.96
1	-				well cas	ing)		· - · · · · - ·	·"  -	
, -	h bailer and baile								i	
_	h bailer and pump		. 🖳		Date:		. —	/ 26 / 97	•	9 / 26 / 97
1 -	h block and bailed		<u> </u>				mm			mm dd yy
_	h block and pump							a.m	ı	a.m
	h block, bailed an	d pumped	<u> </u>		Time:		c. 10 :	21 D p.m	· 11	_ : <u>12</u> 🗍 p.m
compresse			Ф		<b>.</b>		j			
bailed only			<b>P</b>		11 Sedimer	it in well	ĺ			
pumped on	•			·	bottom:			. — · — inch	ies	inch
pumped sle	•				10 11/14-10			_		
Other	surged w/ pump	periodically	y 🗀		12 Water O	bservations:	Clear		i i	ear 📺
2 Time	المديد مانسمام			2 8 min.			Turbid	ha)		rbid 🔲
3. Time speni	developing well		<b>+</b>	<del>2</del> <del>8</del> mm.		Color	(Descri	•	J (D	escribe) Clear
4. Total well	denth (has)		•	3.0 ft.		Odor	Lt Gray	<u></u>	.	Clear
4	construction sum	mars)	- <u>-</u>	<u> </u>	1	Turbidity	Turbid		.	None
(From wen	CONSULUCTION SOUTH	шацу)	•		1	HNu	Turoid		.	None
Measured v	vell depth (Before	·) (TOIC)	2	4.4 ft.		111/0			.	<del></del>
Measured	ven depar (Detore	.)(1010)		<del></del>	Ella Do alo 34	/-1	0.16002 2	M		4 0
		) (TOIO)	•		Filter Pack V	oi. (gaiions)	0.16(K - T	)ls =	<del></del>	4.0
Measured v	veli depth (After)	)(IOIC)		4.4 ft.	Well casing	Val (gallone)	0 16-2 1	=		1 7
5. Inside dian	reter of well		4.	in.	Well casing	voi. (ganous)	V,101 1		— —	4.7
J. Histor diam	ACCI OF WELL		— — ·	<del></del>	Saturated len	gth of sand p	ack (ft.) (ls)	_		2.2
6. Volume of	water in filter pac	ck and well		8.7 gal.		,	() ()			
casing	•		<del></del>		Length of wa	ter column (f	t) (l)			7.4
1								•		
7. Volume of	water removed fr	om well	6	2 gal.	R = Radius o					
			•	•			le if drilling	fluids were us	sed and	well is
Relative rec	covery rate		ft. per.	min.	at solid waste	e facility:				
j					13 Total su	spended soli	ds 1		mg/l	mg/
3. Volume of	water added (if a	ny)	None	. gal.		Unfiltered)				
	•	•				·	1			
9. Source of v	vater added				14. COD	TT . CU	16.		mg/l	mg/
		· · · · · · · · · · · · · · · · · · ·	<del></del>			Unfiltered St	muric) ,	(BEFORE)	·	(AFTER)
Time	Gallons Purged	pН	Spec. Cond. (umhos/cm)	T deg. C	Spec. Cond. at 25 deg. C	Color	Odor	Turb. (NTU)	DO (mg/L)	Comments
					at 25 deg. C			(1410)		Comments
1042	10	6.86	1477	9.97		Cloudy/Gr	ay	51.0	0.68	
1045	20	6.85	1473	9.97		Clear		13.7	0.65	
1050	30	6.85	674	10.06	<b>-</b> ""	Clear		11.6	0.76	
1055	40	6.86	603	10.03		Clear		3.8	0.71	
1100	50	6.86	519	10.10		Clear		10.6	1.22	
1102	55	6.86	505	10.10		Clear	<u> </u>	4.8	1.16	
		<del>                                     </del>		<del>                                     </del>	<del> </del>					<del></del>
1105	62	6.86	517	10.06		Clear		2.1	1.12	
Note: DO =	Dissolved Oxyg	gen			· · · · · · · · · · · · · · · · · · ·					
			<del></del>			<del></del>	<del></del>	<del></del>		<u> </u>

# WATSON

## MONTGOMERY MONITORING WELL DEVELOPMENT SUMMARY

••••	-	_
(117)		
w		

Project Name	Blackwell Landfill	Well No.	G131D
Location	Warrenville	Project No.	1252008.052
Developed By	FJMK/BPG	Checked By	

							·			
1. Can this well be purged dry?		Yes [	] No	Ì	10 Depth to	Water	Before	Development	Aft	er Development
2. Well development method					(from tor well casi	of	a	1 4.9 4	a	4 7.50
surged with bailer and bailed surged with bailer and pumped surged with block and bailed surged with block and pumped					Date:		m	s.m.	ı	11 / 4 / 97 nm dd yy
surged with block, bailed and p compressed air bailed only	oumped				Time:  11 Sediment bottom:	t in well	c. <u>13</u>			_ : _ <u>59</u> <b> </b>
pumped only pumped slowly Other					12 Water O	oservations:	 Clear	_ <u>-</u>	Cle	inch ar
3. Time spent developing well			<u>1 8</u> m			Color	Turbio (Descr Clear		Tur (De	bid □ scribe) C;ear
Total well depth (TOIC) (From well construction summar			4.1 ft			Odor Turbidity HNu	None			None
Measured well depth (Before) (	-		ft	Ì	Filter Pack Vo	ol. (gallons)	0.16(R <sup>2</sup> - r <sup>2</sup>	)ls = _	Nor	ne
Measured well depth (After) (To  5. Inside diameter of well	OIC)	4.	—·— ft ir		Well casing V	ol. (gallons)	0.16r <sup>2</sup> l	= .		<u>5. 1</u>
Volume of water in filter pack a     casing	and well				Saturated length of wat					9. <u>2</u>
7. Volume of water removed from		<del></del>		al.	_	dwater samp		ell radius (in.) g fluids were us	sed and v	well is
Relative recovery rate   Volume of water added (if any)		ft. per. 6  None		al.	at solid waste  13 Total sus  (500 ml	•	ds	<del></del>	mg/l	mg/
9. Source of water added		None	·		14. COD (250 ml)	Unfiltered S	ulfuric)	(BEFORE)	mg/l	(AFTER)
Gallons Time Purged	pН	Spec. Cond. (umhos/cm)	T deg. C		pec. Cond. 25 deg. C	Color	Odor	Turb. (NTU)	DO (mg/L)	Comment
13:50 10	12.41	560	11.29			Clear		96.6	0.93	
13:52 20	12.46	650	11.47			Clear		>100	0.58	
13:55 25	12.41	999	11.93			Clear		95.6	0.47	
13:57 30	12.28	1493	12.33			Clear		48.1	0.78	
-										
Note: DO = Dissolved Oxygen										
- Purged dry after 35 gallor	ns									

ı	М	()	NI	T	CH	IN	- V	VEI	ı	DE	VF	:1 C	P	ME	NT	SI	JMM.	ΔΗ
•	V	J	, , ,		<b>~</b> 111	,,,,,	<b>u</b> .	7 L-L		$\boldsymbol{\nu}$	. V L		,,,,	A1 r	1.4	J	S IAI IAI	_,,

W	

Project Name Blackwell Landfill Well No. G133S
Location DuPage County Project No. 3920.0041
Developed By DAP/ACC Checked By

1. C	an this we	il be purged dry?		☐ Yes	■ No	10	Depth to	Water	Before I	Development	Ai	fter Develop	ment
2. W	ell develo	pment method				."	(from top	p of	a1	5.74	ft	1 5.	7 <u>4</u> f
su su su su	rged with rged with rged with	bailer and bailed bailer and pumpe block and bailed block and pumpe block, bailed and	ed ed	00000			Date:		mn	0 / 23 / 96 a dd yy ■ a.m. 45 □ p.m.		mm dd	/ 96 yy a.m. p.m.
ba pu pu	tiled only imped onl imped slo ther	у				11	bottom:	t in well		inch			_inche
	•	developing well		,	5 0 m	"	Water O	osci valions.	Turbid (Descr		Tu	rbid == escribe)	3
		lepth <del>(TOC)</del> ((construction sum		2	1.0 ft			Color Odor Turbidity HNu	None Moder N/A	y Brown ate		None None N/A	
Mo	easured w	ell depth (Before)	)	2	$\frac{3}{0}$ ft	_			0.000	450			<u> </u>
		ell depth (After)	,		3.0 ft	· w		ol. (gallons) /ol. (gallons)		•		4.6	
1				<del></del>	. <u>0 0</u> ir	Sat	turated leng	gth of sand pa	ack (ft.) (ls)			. 2 6	
	olume of sasing	water in filter pac	k and well	<u> </u>	3.3 gs		ngth of wa	ter column (f	t.) (1)			. 2 6	
7. V	olume of	water removed tro	<u> </u>	<u>5.0</u> g				r = Well radius (in.) e if drilling fluids were used and well is					
Re	lative rec	overy rate		ft. per.	n		solid waste		le if drilling	fluids were use	ed and v	vell is	
8. V	olume of	water added (if ar	ıy)	None	g	al.		spended solid Untiltered)	is	·	mg/I		_ mg/l
9. Sc	ource of w	ater added		None		14	. COD (250 mi	Unfiltered Su	iltunc)	(BEFORE)	mg/l	(AFTER)	_ mg/l
	ime	Gallons Purged	pН	Spec. Cond.	T deg. C		Cond. deg. C	Color	Udor	Meter Turb.	ນ.ບ.	Comm;	
	3:30	15	7.53	1050	13.2		L	t Gray Brov	VII None	Mod. Turb	1.70	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
1	3:33	30	7.22	1070	13.0			Clear Gray	None	Low Turb.	1.74		
<b></b>	3:36	40	7.13	1075	13.0			Clear Gray	None	Low Turb.	1.57		
<b>—</b>	3:39	60	7.25	1072	13.0		<u> </u>	Clear Gray	None	Week to Cles	1.55		
	3:42	75	7.10	1080	12.9			Clear	None	Week to Clea	1.50	-	
<u> </u>	_												_
				ļ									
<u> </u>			<del>  </del>		ļ			ļ					
<u> </u>				<b></b>	<b>↓</b>							<u> </u>	
1./30	20\Gint\C1	33sDEV.xls	<u> </u>	L	<u></u>	<u> </u>		<u> </u>	<u> </u>	<u> </u>		<u> </u>	

## MONITORING WELL DEVELOPMENT SUMMARY

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w	N	~~	,		



Well No. Project No. Checked By Blackwell Landfill
DuPage County
DAP/ACC G133D 3920.0041 Project Name Location Developed By

1.	Can this we	ell be purged dry?		☐ Yes	■ No			Before D	evelopment	Aft	er Development	
2.	Well develo	opment method				(fror	h to Water n top of	a1	6.20 ft	ı.	1 6.20 ft.	
	surged with	n bailer and bailed				weii	casing)					
		bailer and pumpe				Date	:	Ь. 10	/ 23 / 96		10 / 28 / 96	
		block and bailed					•	mm	dd yy	;	mm dd yy	
	-	block and pumpe				1			a.m.		a.m.	
	_	block, bailed and				Time	<b>2</b> :	c. 9 :		2	: 50 <b>m</b> p.m.	
	compressed		- F F				,			-		
ł	bailed only					ll Sedi	ment in well					
	pumped onl					botto			1 . 2 inches	,	0. inches	
	pumped slo			ā								
1		Surged with Pum	ıD	=		12 Wate	er Observations:	Clear		Cle	ar 🗀	
1			<u> </u>	_				Turbid			rbid 🗀	
3.	Time spent	developing well		6	0 0 m	nin.			escribe)			
1	•					}	Color	White/0	Gray		Clear	
4.	Total well d	depth <del>(TOC)</del> — (C	GS)	5	3.0 ft	.	Odor	None		'	None	
		construction sumn	•				Turbidity	Turbid		1.	None	
	•		•				HNu	N/A		'	N/A	
7.0	Measured w	ell depth (Before)	)	5	4.0 ft	. l				'		
4	Measured well depth (After)  Inside diameter of well  Volume of water in filter pack and well casing  Volume of water removed from well  2 1 0 0					Filter Pac	k Vol. (gallons)	0.057(R-z-	)ls =	1	4.3	
	Measured w	ell denth (After)		5	4 1 ft		k voi. (gailons)	0.057(10 -1	,is – <u> </u>	_ <del>-</del>	<del></del>	
1	MICOSCICO W	on depair (rener)			<del></del>		ng Vol. (gallons)	0 16c <sup>4</sup> 1	=	2	4.2	
5.	Inside diam	eter of well		4	. 0 0 in		Saturated length of sand pack (ft.) (ls) 1 2.0					
1						Saturated						
6.	Volume of	water in filter pac	k and well	3	8.5 g							
1	casing				_	Length of water column (ft.) (1) 3 7.8						
1/2.	Volume of	water removed tro	om well	2 1	U.Ug	ai.   K = Kadu	is of borehole (in	.) r= Wel	l radius (in.)			
							oundwater samp			l and w	rell is	
	Dalaston	over mte		ft. per.	n		aste facility:	J				
1	Relative rec	overy rate		··· • · · · · · · · · · · · · · · · · ·			•					
	KCIAUVE PCC	overy rate	···		<del></del>	1 4 Tota	-	1e	~	ng/	ma/l	
				None	g		I suspended solid	ds		ng/l	mg/l	
8.	Volume of	water added (it an		None	g	al. (500	I suspended solid mi Untiltered)	ıs				
8.		water added (it an			g	al. (500 14. CO1	I suspended solid mil Untiltered)			ng/i	mg/l	
8.	Volume of	water added (if an		None None		al. (500 [4. COL (250	I suspended solid mi Untiltered) mi Untiltered Su					
8.	Volume of Source of w	water added (it an water added Gallons	ny)	None None Spec.	Т Т	al. (500 14. CO1 (250 Spec. Cond.	I suspended solic mi Untiltered) mi Untiltered Su	iltune)	(BEFORE)	ng/I	(AFTER) mg/I	
8.	Volume of	water added (if an		None None		al. (500 [4. COL (250	I suspended solid mi Untiltered) mi Untiltered Su		(BEFORE)		mg/l	
8.	Volume of Source of w	water added (it an vater added Gallons Purged	pH	None  Spec. Cond.	T deg. C	al. (500 14. CO1 (250 Spec. Cond.	d suspended solic mi Untiltered) mi Untiltered Su Color	ulturic)  Odor	(BEFORE) Turb. Turbid	ng/I	(AFTER) mg/I	
8.	Volume of Source of w	water added (it an water added Gallons Purged 40	рн 	None  Spec. Cond.	T deg. C	al. (500 14. CO1 (250 Spec. Cond.	d suspended solid mi Untiltered)  mi Untiltered Su  Color  Gray	Udor None	Turb. Turbid Clear	ng/I υ.υ.	(AFTER) mg/I	
8.	Volume of Source of w	water added (if an water added  Gallons Purged  40  80	pH 7.68	None Spec. Cond 875	T deg. C	al. (500 14. CO1 (250 Spec. Cond.	d suspended solid mit Untiltered)  mit Untiltered Solid Color  Gray  Clear	Odor None None	(BEFORE) Turb. Turbid Clear Clear	D.U.	(AFTER) mg/I	
8.	Volume of Source of we Time 14:00 14:10 14:20	water added (if an vater added  Gallons Purged  40  80  120	pH 7.68	None Spec. Cond 875	T deg. C 13.0 12.3	al. (500 14. CO1 (250 Spec. Cond.	Clear	Odor None None None	Turb. Turbid Clear Clear	D.U.  0.86  0.78	(AFTER) mg/I	
8.	Volume of Source of we Time 14:00 14:10 14:20 14:30	water added (if an water added  Gallons Purged  40  80  120  160	pH 7.68 7.10 7.10	None Spec. Cond 875 888 875	T deg. C 13.0 12.3 12.2	al. (500 14. CO1 (250 Spec. Cond.	Clear  Clear  Clear  Clear	Odor None None None None	Turb. Turbid Clear Clear Clear	D.O.  0.86  0.78  0.77	(AFTER) mg/I	
8.	Volume of Source of we 14:00 14:10 14:20 14:30 14:40	water added (it an vater added  Gallons Purged  40  80  120  160  190	pH 7.68 7.10 7.00	None Spec. Cond 875 888 875 875	T deg. C 13.0 12.3 12.2 12.0	al. (500 14. CO1 (250 Spec. Cond.	Clear Clear Clear Clear	Odor None None None None None	Turb. Turbid Clear Clear Clear	D.O.  0.86  0.78  0.77  0.70	(AFTER) mg/I	
8.	Volume of Source of we 14:00 14:10 14:20 14:30 14:40	water added (it an vater added  Gallons Purged  40  80  120  160  190	pH 7.68 7.10 7.00	None Spec. Cond 875 888 875 875	T deg. C 13.0 12.3 12.2 12.0	al. (500 14. CO1 (250 Spec. Cond.	Clear Clear Clear Clear	Odor None None None None None	Turb. Turbid Clear Clear Clear	D.O.  0.86  0.78  0.77  0.70	(AFTER) mg/I	
8.	Volume of Source of we 14:00 14:10 14:20 14:30 14:40	water added (it an vater added  Gallons Purged  40  80  120  160  190	pH 7.68 7.10 7.00	None Spec. Cond 875 888 875 875	T deg. C 13.0 12.3 12.2 12.0	al. (500 14. CO1 (250 Spec. Cond.	Clear Clear Clear Clear	Odor None None None None None	Turb. Turbid Clear Clear Clear	D.O.  0.86  0.78  0.77  0.70	(AFTER) mg/I	
8.	Volume of Source of we 14:00 14:10 14:20 14:30 14:40	water added (it an vater added  Gallons Purged  40  80  120  160  190	pH 7.68 7.10 7.00	None Spec. Cond 875 888 875 875	T deg. C 13.0 12.3 12.2 12.0	al. (500 14. CO1 (250 Spec. Cond.	Clear Clear Clear Clear	Odor None None None None None	Turb. Turbid Clear Clear Clear	D.O.  0.86  0.78  0.77  0.70	(AFTER) mg/I	
8.	Volume of Source of we 14:00 14:10 14:20 14:30 14:40	water added (it an vater added  Gallons Purged  40  80  120  160  190	pH 7.68 7.10 7.00	None Spec. Cond 875 888 875 875	T deg. C 13.0 12.3 12.2 12.0	al. (500 14. CO1 (250 Spec. Cond.	Clear Clear Clear Clear	Odor None None None None None	Turb. Turbid Clear Clear Clear	D.O.  0.86  0.78  0.77  0.70	(AFTER) mg/I	

Y	F

	MONTO WELL DEVELOT MENT COMMAND									
Project Name	Blackwell Forest Preserve	Well No.	G135							
Location	Warrenville, IL	Project No.	1252008.051602							
Developed By	JMK, BPG	Checked By								

1. Can this w	ell be purged dry	?	📕 Yes 🗌	] No			Before I	Development	Af	ter Development
<b>.</b>					10 Depth to			0 0 0		
2. Well devel	opment method				(from to well cas	pot ing)	a2	8.30	. <sup>n.</sup>	7 2.25
surged with	h bailer and baile	d	Ф			<i>U</i> ,			I	
_	h bailer and pum		ō		Date:		[ в. 9	/ 24 / 97		9 / 24 / 97
surged with	h block and baile	d			1		mm	dd yy	•	mm dd yy
surged with	h block and pump	ed						a.m	.	□ a.m
surged with	h block, bailed an	d pumped			Time:		c. <u>12</u> :	02 <b>p</b> .m	. 15	_ : <u>18</u> 👚 p.m
compressed					İ				]	
bailed only			Ф		11 Sedimen	it in well				
pumped on	•				bottom:		_	· inch	les	incl
pumped slo	•	الممانية	y 🗀		12 Water O	haamatiaaa	C1			
Other	surged w/ pump	periodicali	y LJ		12 Water O	oservations:	Clear Turbid		Cle	<del>-</del>
3 Time spent	developing well			8 7 min.			(Descri	_	1	rbid   cscribe)
Table speni	. co vetobringem		+		1	Color	Dark G	-	1,0	Clear
4. Total well	depth (bgs)		8	2.0 ft.		Odor			·	
	construction sum	mary)	<del></del>		ł	Turbidity	Turbid		·	None
		**	i •		1	HNu			·	
Measured v	vell depth (Before	e) (TOIC)	8	4.2 ft.						
					Filter Pack V	ol. (gallons)	$0.16(R^2 - r^2)$	)ls =		6.9
Measured v	vell depth (After)	) (TOIC)		ft.				•		
<b> </b>					Well casing \	Vol. (gallons)	0.16r <sup>2</sup> 1	=	3	5.6
5. Inside diam	eter of well		<u> </u>	— — <sup>in.</sup>	Saturated len	ath of cond n	ack (A ) (le)			3.6
6. Volume of	water in filter pa	ck and well	4	2.5 gai.	Saturated Ich	en or serie b	aux (IL) (IS)	•		<u> </u>
casing	, ,				Length of wa	ter column (f	t.) (1)		5	5.6
						•		•		· — —
7. Volume of	water removed fr	om well	6	5.0 gal.	R = Radius of borehole (in.) r = Well radius (in.)  Collect groundwater sample if drilling fluids were used and well is					
Dolosius ass		1.3	ft. per. 1	min.	at solid waste		le if drilling	fluids were us	sed and v	well is
Relative rec	xovery rate		ic per.	—— шш.	at solid waste	tactiffy.				
· ·						spended soli	ds		mg/l	. mg.
್ಷ3. Volume of	water added (if a	ny)	None	gal.	(500 ml	Unfiltered)			,	
9. Source of v	water added			•	14. COD				mg/l	mg.
). DOZEG GI						Unfiltered St	ılfuric)	(BEFORE)		(AFTER)
	Gallons		Spec. Cond.	T	Spec. Cond.	·		Turb.	DO	
Time	Purged	pН	(umhos/cm)	deg. C	at 25 deg. C	Color	Odor	(NTU)	(mg/L)	Comments
1359	20	12.00	2312	10.91		Lt Gray		34.6	4.08	
1413	40	8.85	592	11.54		Clear		208.0	4.29	
1444	50	7.94	618	11.64		Clear		13.1	0.18	-
1455	55	7.98	596	11.65		Clear		9.5	0.20	
1500	57	8.00	622	11.71		Clear		11.8	0.19	
1509	61	7.93	618	11.75		Clear		10.0	0.13	
1513	63	7.95	619	11.82		Clear		4.7	0.06	
1515	65	8.04	618	11.89		Clear		4.3	0.11	
<u> </u>	rged Dry After	40 gal · 1	DO = Discolu	ed Overse						
inoics. I. Pt	ugou Diy Auci	70 gai., 2	DO - DISSUIT	OAYBEIL	·	L	i	<u></u>	<u> </u>	<u> </u>

### MONITORING WELL DEVELOPMENT SUMMARY

<b>Project</b>	Name
Locatio	n

Well No.

G138

A	N.
	7)
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Blackwell Landfill DuPage County DAP/ACC Developed By

Project No. Checked By 3920.0041

1. Can this well be purged dry?	☐ Yes	■ No			Before D	Development	Aft	er Development
2. Well development method			(1	Depth to Water from top of yen casing)	a1	6.83	ft	1 6.8 0 f
surged with bailer and bailed surged with bailer and pumped surged with block and bailed surged with block and pumped surged with block, bailed and pumped	0000		E	ate:	mm	☐ a.m.	i	10 / 29 / 96 mm dd yy
compressed air bailed only pumped only pumped slowly Other	000 - 00		11 S	ediment in well ottom: Vater Observations:	c:	p.m		
3. Time spent developing well		<u>3</u> <u>5</u> m		Color	Turbid (Descri Sl. Clo	be)	Tur	rbid   escribe)  Clear
4. Total well depth (TOC) (GS) (From well construction summary)	<del>_</del>	4.0 ft		Odor Turbidity HNu	None Cloudy N/A			None Clear N/A
Measured well depth (Before)  Measured well depth (After)		6.2 ft	Filter	Pack Vol. (gallons)		•		4.3
5. Inside diameter of well  6. Volume of water in filter pack and well		. <u>0</u> <u>0</u> in 9 . 5 g	. Satura	casing Vol. (gallons)  sted length of sand pa		<b>=</b> .		5. <u>2</u> <u>2</u> . <u>0</u>
casing		<u> </u>		h of water column (fi	t.) (l)			9.4
Volume of water removed from well  Relative recovery rate	1 / ft. per	<u>5.0</u> g	Collec	adius of borehole (in it groundwater samp d waste facility:			ed and w	ell is
8. Volume of water added (if any)		· g		otal suspended solid SUU ml Untiltered)	is		.mg/l	mg/l
9. Source of water added				250 ml Untiltered Su	iltune)	(BEFORE)	mg/l	(AFTER)
Gallons Time Purged pH	Spec. Cond.	T deg. C	Spec. Co at 25 deg		Udor	Meter Turb.	ນ.ບ.	Comment
11:32 35 7.45	1015	11.6	<u> </u>	Sl. Cloudy	None	43.50	3.43	200 NTU Scale
11:40 70 7.08	1033	11.4		Clear	None	8.57	3.11	201 NTU Scale
11:48 105 7.10	1039	11.2		Clear	None	3.92	2.91	202 NTU Scale
11:56 140 7.05	1026	11.2		Clear	None	2.65	2.62	203 NTU Scale
12:04 175 7.05	1025	11.2		Clear	None	2.46	2.60	204 NTU Scale
	ſ				<del></del>	+	<del></del>	<del> </del>
					<u> </u>			
		,						

# WATSON

MOMINOUM C	WELL DEVELOPMEN	I DANNING I

Project Name	Blackwell Landfill	Well No.	G139	
Location	DuPage County	Project No.	3920.0041	
Developed By	DAP/ACC	Checked By		

1. C	an this we	Il be purged dry?	)	☐ Yes	■ No			· · · · · · · · · · · · · · · · · · ·	Before	Development	Af	ter Development
1		pment method				- 1	10 Depth to (from top			1 0.15		
[		-	_				wen casi		<del>"</del>		·"· —	1 0.10
	-	bailer and bailed bailer and pump					Date:		   b.	0 / 23 / 96	ļ	10 / 29 / 96
su	rged with	block and bailed	ŀ	0			Duic.		mi		. 1	mm dd yy
	_	block and pumpe					<b>7</b> 2:			☐ a.m		a.m
	irgea with impressed	block, bailed and air	ı pumpea				Time:		c. 2		. 10	_ : <u>30</u> p.m
ba	iled only			<u> </u>		1	11 Sedimen	t in well			ı	
-	imped onl imped slo	•				į	bottom:		_	·_ inch	ies	inch
,	ther					ł	12 Water Ol	oservations:	Clear		Cl	ear 💼
3 7	me chent	developing well			5 O π				Turbio (Desc	_		rbid   escribe)
]. "	me spen	developing well		<del></del>	<u> </u>			Color	Clear	ille	100	Clear
		lepth <del>(TOC)</del> — (C		5	5.5 ft	t.		Odor	None			None
(F)	rom well o	construction sum	nary)	•				Turbidity HNu	None N/A		.	Clear N/A
d Me	easured w	ell depth (Before)	)	5	7.5 ft	: L						
Î				; 			Filter Pack Vo	ol. (gallons)	0.057(R <sup>2</sup> -1	r²)ls =	1	$\frac{4}{3}$
Me	easured w	ell depth (After)			7.5 ft		Well casing V	ol. (gallons)	0.16r <sup>4</sup> 1	<b>=</b>	3	0.3
5. In	side diam	eter of well		4	. 0 0 is	n.		•		·		
6. V	olume of	water in filter pac	k and well	4	4.6 g		Saturated leng	gin of sand p	ack (ft.) (is	,	<del></del>	2.0
C	asing			-			Length of wat	er column (f	t.) (l)	•	4	7.4
7. V	olume ot	water removed tro	om well	2 2	5. U g					ell radius (in.)		
l Re	lative rece	overv rate	•	ft. per.			Collect ground at solid waste		le if drilling	fluids were use	ed and w	vell is
"	1001	overy rais		per.	<del></del>	\ \ \ \ \ \		•			1	
8. V	olume of	water added (it ai	ny)		. g	ai.	13 Total sus (500 mi (	pended soli Untiltered)	as		mg/l	mg/
y. so	ource of w	ater added					14. COD				mg/i	mg/
<u></u>					<del></del>			Untiltered St	iltune)	(BEFORE)		(AFTER)
<u>.l</u> .	Ime	Gallons Purged	рн	Spec. Cond.	deg. C		ec. Cond. 25 deg. C	Color	Udor	Meter 't'urb.	D.O.	Comme
	0:40	45	7.68	710	11.3			Clear	None	22.50	5.96	200 NTU Scal
	0:50	90	7.70	725	10.9			Clear	None	16.00	4.84	201 NTU Scal
1	1:00	135	7.62	722	10.8			Clear	None	6.70	4.60	202 NTU Scal
1	1:10	180	7.62	715	10.8			Clear	None	4.38	4.42	203 NTU Scal
	1:20	200	7.55	717	10.8			Clear	None	3.98	4.40	204 NTU Scal
					i i							
				<del></del>								
				<del>                                     </del>	1				<b> </b>			
											·	
			1			<del></del>						
					<b>†</b>					+		
Ц		<u> </u>	<del></del>	<u> </u>		L		L	<u> </u>		L	L

MONTGOMERY	MONITORI	NG WELL DEVELOPM	ENT SUMMARY	-
WATSON	Project Name	Blackwell Landfill	Well No.	G140D
	Location	DuPage County	Project No.	3920.0041
	Developed By _	DAP/ACC	Checked By	

1. Can this we	ell be purged dry?		☐ Yes	■ No	$\Box$			Before I	Development	Afi	er Development
2. Well develo	opment method					10 Depth to (from top wen casi	of	a	3.66	ft	1 3.6 1 ft.
surged with surged with surged with	n bailer and bailed n bailer and pumpen n block and bailed n block and pumpen n block, bailed and	ed ! ed	0000			Date:		b. 10 mm	a.m.		10 / 28 / 96 mm dd yy a.m. : 30 p.m.
compressed	l air	a pumpea						C. <u>11</u> .		`   <u>~</u>	. <u>30</u> [] p.m.
bailed only pumped on pumped slo	ly		· 🔲			11 Sediment bottom:	t in well		inch	es	inches
Other			. $\square$			12 Water Ob	oservations:	Clear Turbid		Cle	ear <b>m</b> rbid 🖂
3. Time spent	developing well			<u>1 5</u> m	in.		Color	(Descri	ibe)		escribe)
4. Total well of	lepth <del>(TOC)</del> — ((	GS)		. ft	.		Odor	Cloudy None	wnite		Clear None
(From well	construction sum	nary)					Turbidity HNu	Turbid N/A			Clear N/A
J Measured w	ell depth (Before)	)	6	0.7 ft	. L		11110	100			IVA
Υ.,	-11 1 (A.G. )					Filter Pack Vo	ol. (gallons)	0.057(R <sup>4</sup> - r <sup>4</sup>	)ls =	<u>.</u> .	3.2
	ell depth (After)	*		$\frac{0.7}{}$ ft		Well casing V	ol. (gallons)	0.16r <sup>2</sup> 1	=		7.7
5. Inside diam	eter of well		2	. <u>0</u> <u>0</u> in		Saturated leng	rth of sand pa	nck (ft.) (ls)	•		7. 0
6. Volume of casing	water in filter pac	k and well	1	1.0 ga	al.	Length of wat	•		•		
	unter removed to	om well		/\	1	•			O moderno (m. )		7.1
	water removed tre			<u>U</u> . <u>U</u> ga	<u> </u>		dwater sampl		Il radius (in.) fluids were use	ed and w	rell is
Relative rec	overy rate		ft. per.			at solid waste	facility:				
8. Volume of	water added (if ar	ıy)		g	ai.	13 Total sus (500 ml )	pended solic Untiltered)	is		mg/l	mg/l
9. Source of v	vater added					14. COD				mg/l	mg/t
<b></b>	Gallons		Spec.	Т	Spe	ec. Cond.	Unfiltered Su	ituric)	(BEFORE) Meter	<u>'</u>	(AFTER)
Time	Purged	pН	Cond.	deg. C		25 deg. C	Color	Udor	Turb.	D.O.	Comment
9:05	10	7.02	960	11.1			White/Yellow	None	Clear	1.14	Turb. meter
9:07	20	7.06	950	11.1		S	L Cloudy Whi		Clear	1.15	charge ran out
9:10	30	7.00	950	11.1			Clear	None	Clear	1.20	
9:12	40 50	6.99	950	11.1			Clear	None	Clear	1.26	
9:15 9:20	50 60	6.90 6.95	950 950	11.1			Clear	None	Clear	1.24	
9:20	00	0.93	930	11.1			Clear	None	Clear	1.20	
			-					<u> </u>		-	
										<u> </u>	
							<del></del>				

Y	ľ

Project Name	Blackwell Landfill	Well No.	G141D
Location	DuPage County	Project No.	3920.0041
Developed By	DAP/ACC	Checked By	

1. Can this we	ell be purged dry?		☐ Yes I	No				Before l	Development	Af	ter Development
2. Well devel	opment method					10 Depth to (from top wen cash	of	a	6.41	. ft	<u>1 6 4 0</u> ft
surged with surged with surged with surged with	n bailer and bailed n bailer and pumpe n block and bailed n block and pumpe n block, bailed and	ed ed	00000			Date:		b. <u>10</u> mn	a.m		10 / 24 / 96 mm dd yy □ a.m. : 00 ■ p.m.
compressed bailed only pumped on pumped slo Other	ly		0 0 0 0			11 Sediment bottom:	in well		inch		inches
	developing well		<del></del>	3 4 m	nin.			Turbid (Descr		Tu	rbid   escribe)
•	depth <del>(TOC)</del> (C construction summ		<del></del>	f		•	Color Odor Turbidity HNu	Clear None Clear N/A			None Clear N/A
ĺ	vell depth (Before)		. —	3.8 ft	Ī	Filter Pack Vo	ol. (gallons)	0.057(R <sup>2</sup> - r	²)ls =		8.2
5. Inside diameter of well				. 0 0 ir	- 1	Well casing V Saturated leng			=	<del></del>	$\frac{7}{2} \cdot \frac{7}{0}$
Volume of water in filter pack and well casing				6.0 g	al.	Length of wat	•				7.3
7. Volume of water removed from well 8 5.0 gal.  Relative recovery rate ft. per.					al.	<ul> <li>K = Kadius of borehole (in.) r = Well radius (in.)</li> <li>Collect groundwater sample if drilling fluids were used and well is at solid waste facility:</li> </ul>					
8. Volume of	water added (it ar	ıy)	<del></del>	g	al.	13 Total sus (500 ml (	pended solic Untiltered)	is	***	mg/l	mg/l
9. Source of v						14. COD (250 ml Untiltered Sultur		tturic) (BEFORE) mg		mg/I	(AFTER) mg/l
Time	Gallons Purged	рН	Spec. Cond.	T deg. C		pec. Cond. 25 deg. C	Color	Udor	Meter Turb.	D.O.	Comme
1:22	20	7.50	680	12.5			Clear	None	1.48	1.20	
1:31	40	8.14	697	12.8			Clear	None	0.51	1.15	
1:37	55	8.26	692	12.5			Clear	None	0.44	1.10	
1:43	70	8.40	686	12.2			Clear	None	0.28	1.09	
1:49	85	8.44	684	12.2			Clear	None	0.19	1.14	

# WATSON

## MONTGOMERY MONITORING WELL DEVELOPMENT SUMMARY

(fff)

Project Name	Blackwell Landfill	Well No.	G142
Location	Warrenville	Project No.	152008.051602
Developed By	JMK/BPG	Checked By	

<ol> <li>Can this well be purged dry</li> </ol>	r?	☐ Yes	No			Before D	evelopment	Aft	er Development	
				10 Depth to						
2. Well development method				(from tog well case		a 1	6.85	ft.	1 6.8 5 ft.	
surged with bailer and baile	м								ĺ	
surged with bailer and pum		Ö		Date:		ъ. 11	/7 / 97	- 1	11 / 7 / 97	
surged with block and baile	•					mm	dd yy	1:	nm dd yy	
surged with block and pum					,	******	a.m.	'	□ a.m.	
surged with block, bailed a	="			Time:		c 12 ·	15 <b>p</b> .m.	13	: 55 p.m.	
compressed air	na pampoa	ū				· <u></u> · .			- · = p.m.	
bailed for 30 minutes				11 Sediment	t in well			- 1	Ī	
pumped		=		bottom:			inche		inches	
pumped slowly				00.00						
Other surged w/ pum	n neriodically			12 Water Of	servations:	Clear		Cle	ar 🖿	
Surged w/ pull	p periodically	-		12 1121010	osci vadons.	Turbid	■	Tur	- <b>-</b>	
3. Time spent developing well	hy numning		2 8 m	in.		(Describ	_		scribe)	
5. Time speak developing wen	oy pampang			•	Color	Reddish	•	(50	Clear	
4. Total well depth (TOIC)		2	3.5 ft		Odor	- NOOGISH	-Diowii	-	Cical	
✓ From well construction sum	mass)		<u></u> "		Turbidity	Turbid		.	None	
A LOUIS MEN CONSTRUCTION SUM					HNu	101010	<del></del>	-	Noise	
Measured well depth (Before	~) (TOIC)	2	3.4 ft	1				-		
Measured well deput (Detoi	e)(IOIC)		<del></del>							
				Filter Pack Vo	ol. (gallons)	0.16(R <sup>2</sup> - r <sup>2</sup> )i:	• -		4.8	
Measured well depth (After)	(TOIC)		_·_ ft	I		•			İ	
5. Inside diameter of well		2.	in	Well casing V	ol. (gallons)	0.16r 1			1.1	
J. MINUS GRALIFOUT OF WOL	Saturated length of sand pack (ft.) (ls) 2.0						2.0			
<ol><li>Volume of water in filter pe</li></ol>	ck and well		5.9 g				_			
casing				Length of water column (ft.) (1)6.6						
7. Volume of water removed	from well	6	5 g	al. R = Radius of	borehole (in.)	r = Well	radius (in.)			
				Collect ground		if drilling flu	ids were used	and well	is	
Relative recovery rate		ft. per	m	in. at solid waste	facility:					
				12 Tatal mus	المنامم المماسم	_				
<ol> <li>Volume of water added (if</li> </ol>	anv)	None	ø	al. (500 ml t	penueu sona: Unfiltered)	•   .		mg/l	mg/l	
1	,/		—·— °		J. 11. 11. 11. 11. 11. 11. 11. 11. 11. 1			i		
9. Sou water added		None		14. COD				mg/l	mg/1	
					Unfiltered Sul	furic)	(BEFORE)		(AFTER)	
Gallons		Spec. Cond.	T	Spec. Cond.			Turb.	DO	_	
Time Purged	pН	(umhos/cm)	deg. C	at 25 deg. C	Color	Odor	(NTU)	(mg/L)	Comment	
1324 5	7.22	157	11.77		brown		>1000	5.67		
1327 10	7.19	152	11.79	<u> </u>	lt. brown		>1000	5.27		
1330 15	7.18	215	11.79		lt, brown		808	4.91		
1333 20	7.21	423	11.79		clear		138	4.67	surge	
1335 25	7.20	681	11.81		brown		>1000	5.06		
1337 30	7.20	809	11.78		lt brown		>1000	4.53		
1338 35	7.20	1007	11.78		lt brown		909	4.39		
1340 40	7.20	995	11.79		lt brown		305	4.30	surge	
1342 45	7.19	1053	11.79		brown		>1000	4.26		
1345 50	7.19	1052	11.77		It brown		845	4.18		
1346 55	7.19	1060	11.77	<u> </u>	It brown		267	4.16		
1348 60	7.19		11.77						<del></del>	
		1066			clear		76.0	4.12		
1350 65	7.18	1068	11.77		clear		50.7	4.10		
Note: DO = Dissolved Oxy	gen		1							

## **MONTGOMERY**



MONITORING WELL DEVELOPMENT SUMMARY Project Name Blackwell Forest Preserve

Well No.

Location Warrenville, IL Devel

Project No.

G143 1252008.051602

oped By	JMK, BPG	Checked By
•	<del></del>	<del></del>

l.	Can this we	ell be purged dry?	· · · · ·	☐ Yes ■	No	T.,	Danth to	Wasan	Before I	Development	Af	ter Develop	ment
2.	Well develo	opment method				10	Depth to (from to) wen casi	p of	a1	4.19	-ft	· — — ·.	
	surged with surged with	n bailer and bailed n bailer and pumpe n block and bailed n block and pumpe n block, bailed and	ed ed				Date: Time:		b. 10 mm	a.m	- 1.	_	/ 
	compressed bailed for 3 pumped pumped slo Other	0 minutes	nariodiaally				Sedimen bottom:	t in well	—— Clear	incl			inch
		surged w/ pump   developing well l		· ·	2 <u>8</u> min.		water O	Color	Turbid (Descri Dark G	ibe)	Tu	rbid [ escribe) Clear	
	Total well of	depth (bgs) construction sumr	mary)	2	<u>0</u> . <u>0</u> ft.			Odor Turbidity HNu	None Turbid			None	
	Measured w	ell depth (Before)	(TOIC)	2	2.0 ft.	Files	- De ele M	ol. (gallons)	0.16/P4	Na.		5. 6	工
	Measured w	eil depth (After))	(TOIC)	2	1.4 ft.	1		ol. (gallons)		)Is = =	<del></del>	1. 2	
<ul> <li>5. Inside diameter of well</li></ul>					1	_	gth of sand pa				2.3		
					Length of water column (ft.) (l) 7.8  K = Kadius of borehole (in.) r = Well radius (in.)  Collect groundwater sample if drilling fluids were used and well is								
7. Volume of water removed from well 1 8 0. gal.  Relative recovery rate ft. per. min.													
ช.	Volume of	water added (it ar	1y)	None	gal.			pended solid Untiltered)	is		mg/l		_ mg
9.	Source of w	vater added					COD (250 ml	Untiftered Su	lturic)	(BEFORE)	mg/l	(AFTER)	— mg
	Time	Gallons Purged	pН	Spec. Cond. (umhos/cm)	T deg. C		. Cond. deg. C	Color	Udor	Turb. (NTU)	DO (mg/L)	Commo	
	1002	10	6.95	14	14.67			Dk Brown		312	1.06		
	1010	20	5.88	14	14.55			Slightly Cl	oudy	251	0.38		
	1013	23	7.17	15	13.79			Dk Brown		46.5	0.63		
	1016	26	7.17	14	14.75			Lt. Brown		128	0.39		
	1019	30	7.17	14	14.45			Slightly Cle	oudy	256	0.31		
	1022	33	7.35	17	14.59			Dk Brown		30.5	0.76		
	1024	36	7.18	16	14.35			Brown		68.3	0.45		
	1027	39	7.34	17	14.00			Dk Brown		35.6	0.98		
	1030	42	7.10	16	13.90			Lt. Brown		179	0.43		

		Gallons		Spec. Cond.	T	Spec. Cond.			Turb.	DO	
	Time	Purged	pН	(umhos/cm)	deg. C	at 25 deg. C	Color	Odor	(NTU)	(mg/L)	Comments
_	1033	45	7.10	16	13.12		Dk Brown		58.6	0.74	
j	1035	48	7.04	15	13.09		Md Brown		105	0.42	
	1039	51	7.05	14	14.52		Lt Brown		13.5	0.55	
	1043	54	7.06	13	15.29		Lt Brown		13.1	0.51	
	1048	57	7.08	13	16.30		Lt Brown		11.1	0.30	
	1053	60	7.09	13	16.38		Clear		11.1	0.24	
	1100	70	6.98	387	12.72		Cloudy		147	0.00	
	1103	80	6.97	387	12.70		Brown/Tan		235	0.08	
	1108	90	6.96	388	12.67		Brown/Tan		226	0.03	
	1114	100	6.97	389	12.75		Brown/Tan		177	0.03	
	1352	110	7.00	393	12.74		Clear		45.5	0.50	
	1355	120	6.97	391	12.73		Clear		15.8	0.23	
	1359	130	6.94	391	12.70		Dk Brown		342	0.12	
_	1403	140	6.93	389	12.68	_	Cloudy/Clea	ır	74.0	0.04	
_	1406	150	6.93	39	12.66	•	Clear		15.1	0.00	<u> </u>
	1410	160	6.93	392	12.64		Brown/Tan		344.0	0.07	
_	1413	170	6.92	390	12.64	-	Cloudy/Clea	ır	65.2	0.00	
_	1416	180	6.92	391	12.63	<del></del>	Clear		23.8	0.00	

Note: DO = Dissolved Oxygen

## MONITORING WELL DEVELOPMENT SUMMARY

Blackwell Landfill

Well No.

G144

///	
(==	= 1
111	T.

Project Name Location

Project No.

1252008.051602

|--|

Warrenville Developed By JMK/BPG

\* = Reading recorded right after surging. Specific conductivity not stable as a result.

Checked By

☐ Yes Before Development After Development 1. Can this well be purged dry? ■ No 10 Depth to Water 2. Well development method (from top of a. 8.18 ft. 8.18 wen casing) surged with bailer and bailed surged with bailer and pumped Date: surged with block and bailed mm surged with block and pumped Time: surged with block, bailed and pumped 50 🗆 р.г c. 8 : 16 □ p.m. compressed air П bailed for 30 minutes Sediment in well pumped bottom: inches inc pumped slowly 12 Water Observations: Clear Other surged w/ pump periodically Clear Turbid Turbid 3. Time spent developing well by pumping 3 5 min. (Describe) (Describe) Color Dark Brown Clear 4. Total well depth (TOIC) 1 9.5 ft. Odor (From well construction summary) **Turbidity** Very Turbid None HNu Measured well depth (Before) (TOIC) <u>19.5</u> ft. Filter Pack Vol. (gallons) 0.16(R<sup>2</sup>- r<sup>2</sup>)ls Measured well depth (After) (TOIC) \_\_, \_\_\_ .\_\_ ft. Well casing Vol. (gallons) 0.16r 1 = 1.8 \_\_ 2 .\_\_ in. 5. Inside diameter of well Saturated length of sand pack (ft.) (ls) 3.4 9.9 gal. 6. Volume of water in filter pack and well Length of water column (ft.) (1) 1 1.3 casing 1 2 0. gal. R = Kadius of borehole (in.) r = Well radius (in.)7. Volume of water removed from well Collect groundwater sample if drilling fluids were used and well is at solid waste facility: Relative recovery rate ft. per. min. 13 Total suspended solids mg/l mş (500 ml Untiltered) 8. Volume of water added (if any) None 9. Source of water added None 14. COD mg/l (250 ml Unfiltered Sulturic) (BEFORE) (AFTER) Gallons Spec. Cond. Spec. Cond. Turb. DO T at 25 deg. C Time Purged DΗ (umhos/cm) deg. C Color **Udor** (NTU) (mg/L) Comme 7.13 914 10 1067 12.25 Lt brown 244 0.44 916 20 7.12 1080 339 0.34 12.32 Lt brown surge w/ pun 984 920 30 7.11 12.31 Dk brown 150 0.27 7.11 922 40 1119 12.40 Lt brown 340 0.26 surge w/ pun 926 50 7.11 1026 12.34 118 0.24 brown 929 60 7.11 1077 12.36 Lt brown 345 0.20 surge w/ pun 933 70 7.11 1113 12.36 337 0.19 brown 935 80 7.111107 12.37 Lt brown 341 0.18 surge w/ pun 938 90 7.11112 12.31 Dk brown 6.0 0.17 940 100 7.10 1116 12.37 Lt brown 326 0.17 surge w/ purr 978 943 110 7.10 12.49 brown 6.9 0.16 945 120 7.10 1068 12.36 Lt brown 241 0.16 Note: DO = Dissolved Oxygen

J:\3920\Gint\G144-dEV.xls

# WATSON

## MONTGOMERY MONITORING WELL DEVELOPMENT SUMMARY

W	

Project Name	Blackwell Landfill		Well No.	G145
Location	Warrenville	3	Project No.	1252008.051602
Developed By	JMK/BPG		Checked By	

r					<del></del>							
1. Can this well be purged dry?		☐ Yes 🔣 No		10 Depth to	10 Depth to Water		Before Development		After Development			
2. Well development method			. A		(from top well case	of	a1	9.65	ft	1 9.67 ft.		
surged with	bailer and bailed		. 🗆		1	•						
, -	surged with bailer and pumped				Date:		<b>b</b> . 11	/6 / 97	İ	11 / 6 / 97		
	block and bailed						mm	dd yy		mm dd yy		
1	block and pumpe	<b>d</b>			1		a.m.			III. a.m.		
1 -	block, bailed and				Time:	į	c. R	25 p.m.		: 45 ∏ p.m.		
compressed		· hambon			l ime.		· <u> </u>	P.m.	10	_ · _ <del>- 72</del> 🗀 þ.m.		
bailed for 3					11 Sediment	in well						
pumped	~m.,~~3		=		bottom:			inche		inches		
	pumped slowly				l www.				-	mules		
1	surged w/ pump :	neriodically			12 Water Of	servations:	Clear		Cle	er 📥		
- Suite	andra at hamp !		-		12 ************************************	: + <b>44</b> 0413.	Turbid	 <b>=</b>	1	toid ☐		
3 Time spent	3. Time spent developing well by pumping			2 1 m	in.		(Descri	λε) 		escribe)		
. inne spont	activity and by	\ hambare		<u>-</u> "		Color	Brown	~/	1,0	Clear		
4. Total well d	lenth (TOIC)		4	9.5 ft		Odor				Clear		
	construction summ	195V)		<u> </u>	·	Turbidity	Tudid		·	None		
T (From well o	ansuruction summ	ury)			1	· I	Turbid			None		
					į	H:Nu	<u></u>					
Measured W	ell depth (Before)	(JOIC)		8 9 ft.	· · · · · · · · · · · · · · · · · · ·							
1					Filter Pack Vo	ol. (gallons)	0.16(R <sup>2</sup> - r <sup>2</sup> )	s = .		1.7		
Measured well depth (After) (TOIC)			6	8.8 ft.				•				
1					Well casing V	Well casing Vol. (gallons) 0.16r <sup>2</sup> l =						
5. Inside diame	eter of well			in	4			•				
J						Saturated length of sand pack (ft.) (ls)4 . 0						
1	6. Volume of water in filter pack and well			9.6 gs								
casing	casing				Length of water column (ft.) (1) 4 9.3							
7 1/2	7. Volume of water removed from well			•	.	!haada-1-71 !		landina di N				
/. Volume of	water removed tro	on well	1 0 0. gal. R = Radius of borehole (in.) r = Well radius (in.)						<b>.</b>			
Delader			A		Collect groundwater sample if drilling fluids were used and well is in. at solid waste facility:					i is		
Relative rec	overy rate		ft. per.	m	in. at solid waste	racility:						
1					13 Total sus	pended solid	, 1		mg/l	mg/l		
18. Volume of	water added (if an	ry)	None	. g:		13 Total suspended solids (500 ml Unfiltered)		mg/				
1	<i>`</i>			°		•	}					
9. Source of water added		None		14. COD				mg/l	mg/l			
<u></u>	·	,		<del></del>		Unfiltered Sul	turic)	(BEFORE)	<u> </u>	(AFTER)		
	Gallons	_,,	Spec. Cond.	T	Spec. Cond.		<u> </u>	Turb.	DO	<b>.</b>		
Time	Purged	pH	(umhos/cm)	deg. C	at 25 deg. C	Color	Odor	(NTU)	(mg/L)	Comment		
957	10	7.19	294	10.11		Lt brown		601	0.97			
1002	20	7.17	473	10.14		Clear		228	0.41	surge		
1005	30	7.17	505	10.17		Lt brown		595	0.34			
1009	40	7.16	504	10.16	_ :	Clear		94.2	0.25	surge		
1013	50	7.16	515	10.14		Clear		37.1	0.22			
1016	60	7.16	498	10.15		Clear		17.2	0.21	surge		
1022	70	7.16	56	10.15		Clear		16.6	0.18	<del>                                     </del>		
1026	80	7.16	594	10.18		Clear		192	0.18			
1030	90	7.16	625	10.15		Clear		20.2	0.15	<del>                                     </del>		
1032	95	7.16	602	10.15		Clear		8.3	0.15			
<u></u>								<del></del>	<del></del>	<del> </del>		
1034	100	7.16	605	10.16		Clear		6.1	0.15			
	l	L				<u> </u>						
Note: DO = I	Dissolved Oxyge	en										
								<u> </u>				
L	46.451/		L	l	<u></u>	<u> </u>		l	ــــــــــــــــــــــــــــــــــــــ	<u> </u>		

### MONITORING WELL DEVELOPMENT SUMMARY

AVIDOM	Project Na
	Location
(₹₹₹)	Developed

Project Name	Blackwell Forest Preserve	Well No.	G146
Location	Warrenville, IL	Project No.	1252008.051602
Davolanad By	IMIC DDG	Chacked By	

1. Can this well be purged dry?			☐ Yes ■	No	10.5		Before Development			er Developmen	
2. Well development method				10 Depth to (from to) wen casi	p of	a. <u>1</u>	5.52	ft.	1 5.51		
surged with bailer and bailed surged with bailer and pumped surged with block and bailed					Date:	···s)	b. <u>10</u>	/ 3 / 97 dd yy		10 / 3 / 9 nm dd yy	
surged with	block and pumpe block, bailed and		000		Time:		c. <u>3</u> :	a.m. 20 ■ p.m	1	: a.: : p.:	
pumped	30 minutes		□ <b>=</b>		11 Sedimen bottom:	t in well		inch	es	ind	
pumped slo Other	surged w/ pump	periodically			12 Water O	bservations:	Clear Turbid		Cle	ear <b>m</b>	
- -	3. Time spent developing well by pumping 2 _ 8 min.					Color (Describ					
	4. Total well depth (bgs) 6 9.0 ft.  (From well construction summary)				Odor None Turbidity Turbid HNu				None		
Measured w	Measured well depth (Before) (TOIC)				Filter Pack Vol. (gallons) 0.16(R*-r*)ls = 1 3 . 8						
	Measured well depth (After) ) (TOIC) 7 1 . 4 ft.  5. Inside diameter of well 2 in.  6. Volume of water in filter pack and well 2 2 . 8 gal.				Well casing Vol. (gallons) $0.16r^21 = 9.0$ Saturated length of sand pack (ft.) (ls) $3.6$						
casing	water in titler pac	and wen	<u> </u>	2.8 gal.	Length of wa	ter column (f	t.) (l)			6.0	
7. Volume of Relative rec	water removed fr	om well	1 6 ft. per.	0 gal. min.	K = Kadius of Collect ground at solid waste	dwater samp	<u>. ^                                  </u>	radius (in.) luids were use	d and w	ell is	
	·			<del></del>	13 Total sus	spended soli	ds .		mg/I		
8. Volume of water added (if any)  None gal.  9. Source of water added					(500 ml Untiltered)  14. COD (250 ml Untiltered Sulturic) (8EFORE)				mg/!m		
Time	Gailons Purged	pH	Spec. Cond. (umhos/cm)	T deg. C	Spec. Cond. at 25 deg. C	Color	Udor	Turb. (NTU)	DO (mg/L)		
1612	10	7.83	0.034	10.84	at 23 deg. C	Clear	<u> </u>	124	0.53	Comments	
1616	20	7.32	0.039	10.77	<del></del>	Clear	<del> </del>	135	0.00	··· <u>···</u>	
1620	30	7.23	0.262	10.73	<del></del>	Clear	<del> </del>	55	0.00		
1627	45	7.20	0.182	10.66	<del></del>	Clear	† <u>-</u>	67.5	0.00		
1635	60	7.15	0.389	10.64		Clear		56.8	0.00		
1641	75	7.18	0.384	10.45		Clear		27.6	0.00		
1649	90	7.15	0.389	10.57		Clear/Clou	idy	27.7	0.00		
1700	110	7.15	0.387	10.57		Clear	T	13.1	0.00		
1705	135	7.12	0.391	10.49		СІеаг		12.6	0.00		
1711	150	7.12	0.392	10.50		Clear		9.4	0.00		
1718	160	7.09	0.395	10.52		Clear		9.1	0.00		
	Dissolved Oxyg						<del></del>		0.00		

Note: DO = Dissolved Oxygen
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